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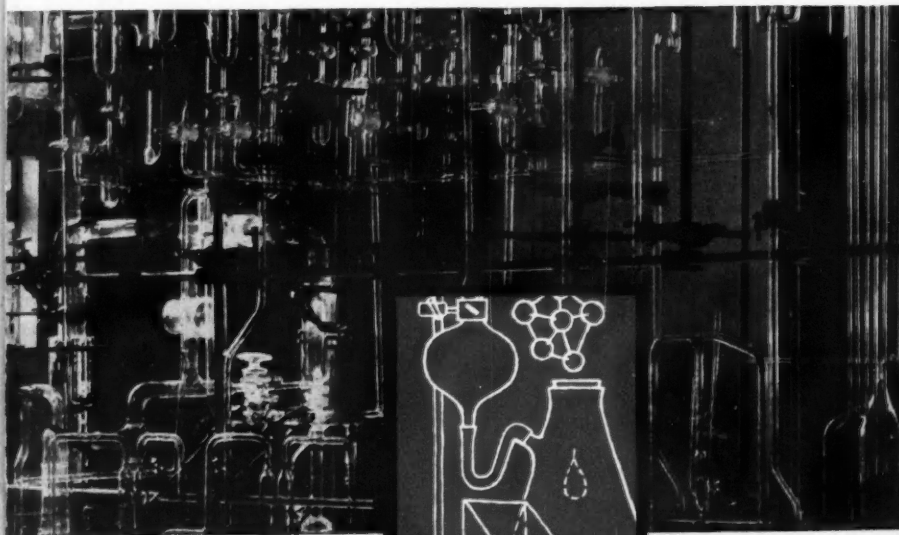
VOL. 4 No. 2142

30 July 1960

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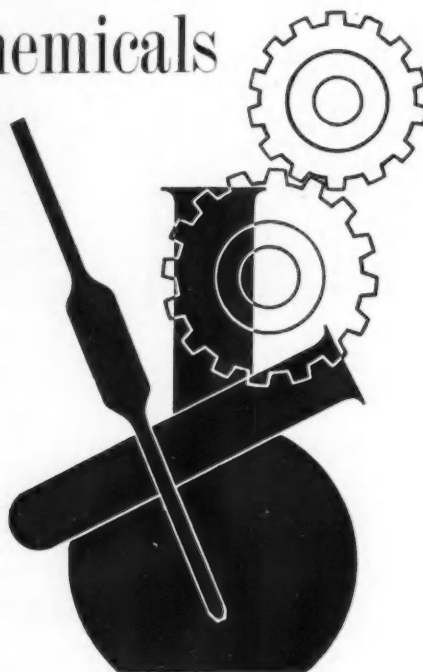
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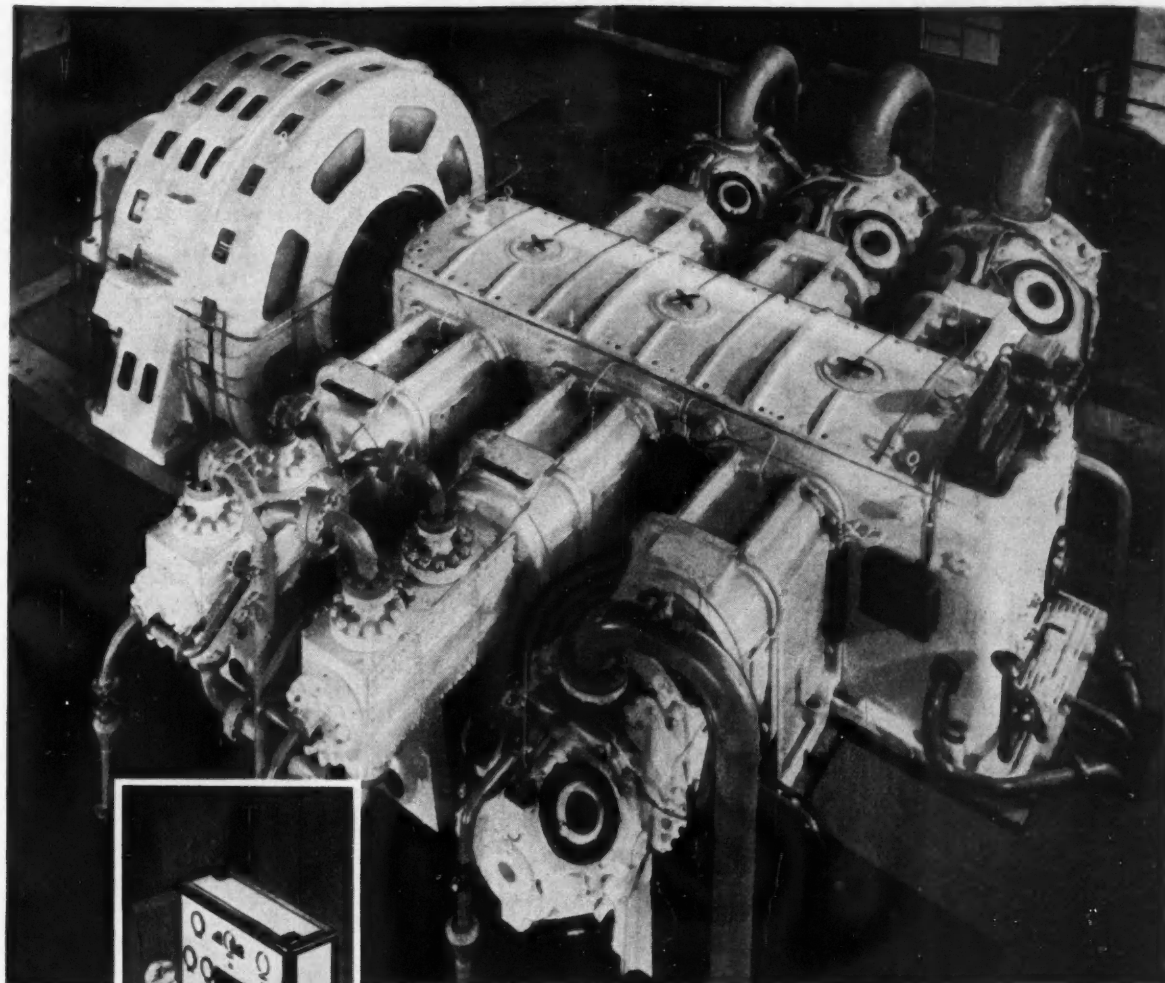
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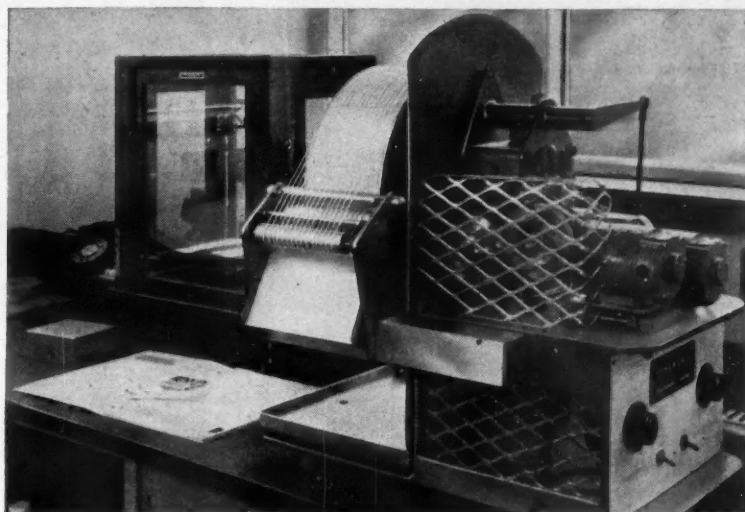
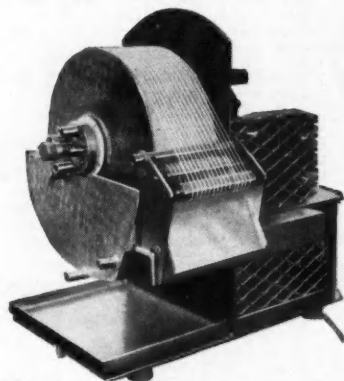
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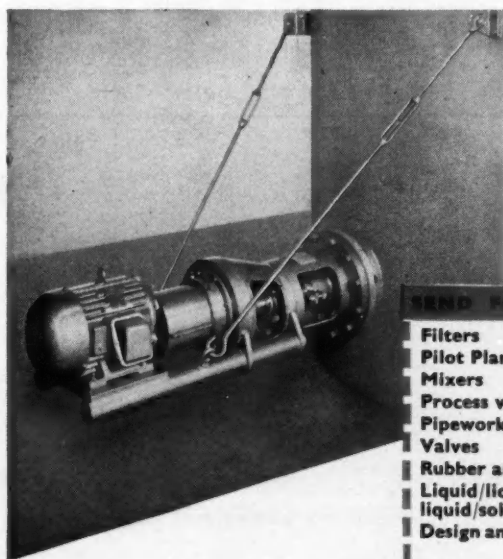
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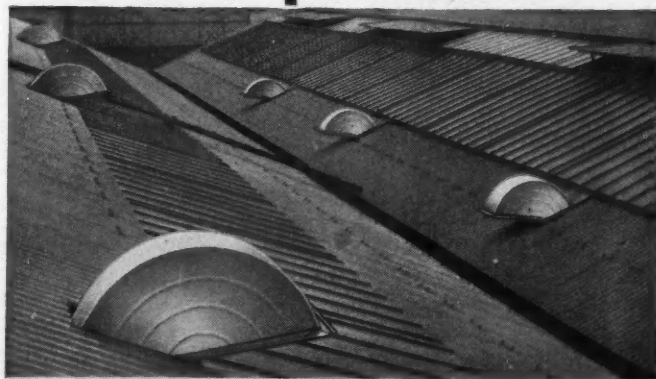
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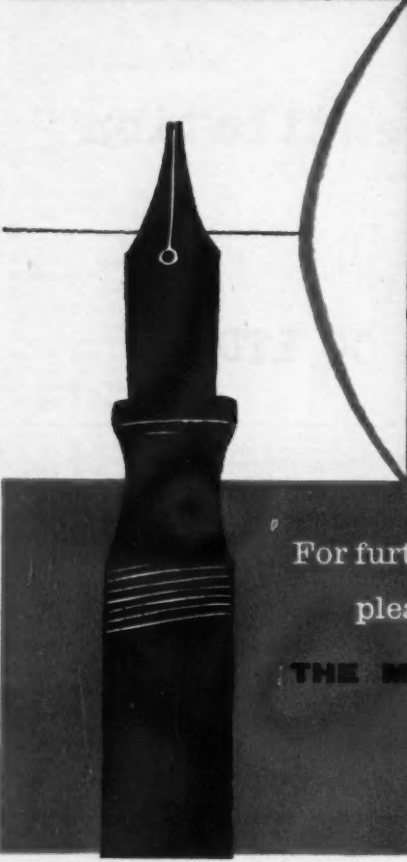
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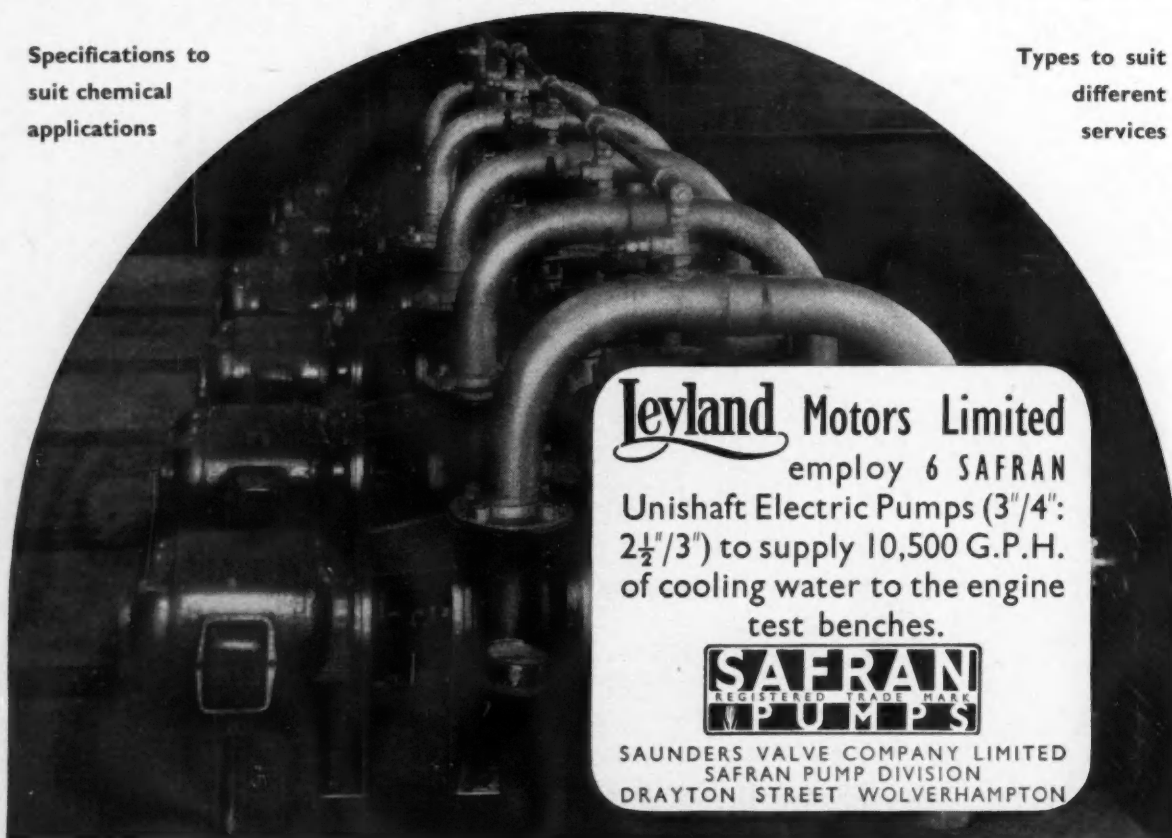
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CHEMICAL AGE

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FLUOROCARBON GROWTH

THE rapid growth of the aerosol industry, which sold 25 million units in the U.K. last year, compared with 1.25 million in 1958, is the main reason for the current expansion of capacity at the Isceon fluorocarbons plant of Imperial Smelting Corporation Ltd. This was reported exclusively in CHEMICAL AGE, 4 June, p. 909. Imperial Smelting, through Consolidated Zinc Pty., are also associated with Monsanto Chemicals (Australia) in the start up of a fluorocarbon plant in Australia.

The only other U.K. producers are I.C.I.'s General Chemicals Division, who produce Arcton fluorocarbons for use in aerosols, refrigeration, air conditioning and fire extinguishing agents.

So far, production in the U.K. has centred on the big tonnage fluorocarbons—the chlorofluoromethanes and -ethanes, world production of which now exceeds 130,000 tons a year. The largest selling compounds are dichlorodifluoromethane—Arcton-12 or Isceon-12—and trichloromonofluoromethane—Arcton-11 or Isceon-11. Imperial Smelting say that a mixture of 50% w/w of each of these fluorocarbons is in their experience the most widely used propellant mixture for aerosol formulations.

Other of the more popular fluorocarbons include chlorodifluoromethane (fluorocarbon-22) for use in refrigeration and air conditioning and for making tetrafluoroethylene, the monomer for p.t.f.e.; trichlorotrifluoroethane (fluorocarbon-113), for use as a refrigerant, in air conditioning and a degreasing solvent, and a starting material for chlorofluoropolymers; dichlorotetrafluoroethane (fluorocarbon-114), a low-pressure aerosol propellant, particularly for aqueous formulations, as an aerosol propellant, in air conditioning and process cooling. In addition there are the brominated fluorocarbons (13B1 and 12B2) which make stable low-toxicity fire extinguishing agents. These are bromotrifluoromethane and dibromodifluoromethane.

The I.C.I. range is Arcton-11, -12, -13, -21, -22, -23, -113 and -114. The Imperial Smelting range is Isceon-11, -12, -22, -113, -114, -12B2 and -13B1. In addition they now list two 'development products'—Isceon-14 (carbon tetrafluoride, a low-temperature refrigerant and heat-transfer liquid), and Isceon-13 (chlorotrifluoromethane, a low-temperature refrigerant). I.C.I. produce polytetrafluoroethylene, but not the chlorinated version, p.c.t.f.e. I.C.I. recently entered the field of brominated fluorocarbons.

The two U.K. producers, like most other of the world's fluorocarbon producers, except in the U.S., produce these 'bread-and-butter' lines. Outside of the U.S., the need has been to expand existing facilities to keep pace with the rising demands for chlorofluoromethanes and ethanes for aerosols, refrigeration and air conditioning. The U.S. producers are faced with a different problem—big overcapacity. Production last year reached a total of 246 million lb. and is expected to total 250 million lb. this year. Capacity is, however, put at 480 million lb. a year. By 1965 it is estimated that production will still be below the current capacity level. Producers are Allied Chemical, E.I. Du Pont de Nemours, Pennsalt Chemicals and Union Carbide.

With a capacity almost twice the total production, attention in the U.S. has been focused on research and development to open the user field. Last

year, about 50% of production went into aerosols, with 44% as refrigerants and 6% for other uses. It is in these other uses—including plastics, films, elastomers, protective coatings, lubricants, textile auxiliaries, solvents, chemical intermediates, blowing agents and fire extinguishing agents that the research effort is now being directed.

Some of the laboratory products that have recently moved into commercial production in the U.S. are described in *Chemical and Engineering News*, 18 July, p. 93. Du Pont have launched octafluorocyclobutane (Freon-C318) on a semi-commercial scale (CHEMICAL AGE, 30 April, p. 724). It is thought that this will become the first fluorocarbon in the U.S. to be approved as a propellant in aerosols for foodstuffs because it is non-toxic, tasteless, odourless and highly stable. Being resistant to hydrolysis, it releases no fluoride ion. Other new Du Pont products are Viton, a copolymer of vinylidene fluoride and hexafluoropropylene which resists heat, oil and solvents; a polyvinyl fluoride film, Teslar, that is being tested as a transparent sheeting for solar energy devices in desalinisation, as a covering for greenhouses and a protective, weather-resistant laminate for wood and metals; and a range of fluoroalcohols.

Allied Chemical have developed plastics from chlorotrifluoroethylene. Known as Halon, these have good resistance to heat and chemicals, good electrical properties, high transparency and low permeability to water, oxygen and carbon dioxide. A modified form is now being developed as a film (C.A., 7 May, p. 768). Allied Chemical are also marketing development quantities of fluoroacids and fluoroketones with possible uses as pharmaceutical intermediates, catalysts for organic reactions and solvents in acid solutions.

As stated in CHEMICAL AGE, 19 March, p. 496, Pennsalt have a new plastics based solely on vinylidene fluoride. Known as RC-2525, it resists heat, light, chemicals and nuclear radiation. With a low melt viscosity, it can readily be moulded or extruded. Pennsalt have also produced development quantities of trifluoroethyl chloride,

now being tested as an aerosol propellant and as an intermediate for drugs and dyestuffs, and trifluoroethyl alcohol under test as a chemical intermediate.

Minnesota Mining and Manufacturing have introduced Fluorel, an elastomer based on vinylidene fluoride and hexafluoropropylene. Designed for use at high temperatures it resists corrosive chemicals, synthetic fuels and lubricants. This company has also been studying a new nitroso fluorocarbon elastomer, a copolymer of trifluoro-nitrosomethane and tetrafluoroethylene. It resists chemicals and solvents and is said to remain flexible at at least -58°F (C.A., 30 April, p. 724).

Shell Chemical in the U.S. are carrying out work on fluorocarbon gases to produce foamed epoxy resins for possible use as insulating materials at low temperatures. Other companies are studying how these gases can be used to foam polythene and p.v.c.

Halocarbon Products, N.J., are producing fluorobutene-2 as a plastics copolymer that can help produce a variety of nonflammable and nonoxidising polymers.

These newer fluorocarbon applications are said to account for a large proportion of U.K. imports of fluorocarbon materials, which are estimated to represent some 30% of the total U.K. consumption. Since it has been estimated that these high-value imports, although accounting for not more than 30% of the total market represent some 50% of the profits earned from fluorocarbons sold in the U.K., it is likely that the two British producers will before long widen their product ranges.

But with capacities now extended to cope with demand for the more popular lines, the U.K. companies may decide to wait until large-scale uses are found for some of the more exotic fluorocarbons that are stemming from U.S. research.

On the research side, work is now being done in the U.S. at the Armour Research Foundation (C.A., 9 April, p. 609) and in the U.K. at Birmingham University under Professor Tatlow on methods for producing aromatic fluorine compounds.

COMPUTERS AND CHEMICAL PLANTS

MUCH has been said and written about electronic computers as an aid to the design and automatic control of chemical plants, but so far little has been heard of their more immediate application to the solution of operational problems. Dr. Youle's paper to the British Computer Society's conference, briefly summarised in CHEMICAL AGE, 23 July, p. 132, brings us closer to this objective. It may be that by being used first for improving the efficiency of existing plants and processes, computers will gain more rapidly the confidence of the chemical industry and their application to the design and control of new plants will receive the impetus it needs.

However, the progress made with computers so far, apart from their managerial and accounting applications (which all have a part to play in the completely automatic factory of the future) has been mainly in the design and control of new plants. In the U.K., we have seen an E.M.I. analogue computer play a vital part in the design and construction of a full-scale hydrogen peroxide plant, while elsewhere, chiefly in the U.S., computers have been columns, heat transfer units, etc. The D.S.I.R. Laboratory at Warren Spring, Herts, are now hoping to achieve computer control of a distillation column (see p. 163).

One British computer concern, Redifon, have recently introduced a system which they consider to be "the

first practical tool for the analysis and design of heat exchangers and chemical reactors which defy normal mathematical treatment and to which only poor approximations are available." This particular system employs a combination of analogue and digital computing techniques, while the new technical principle of 'time quantising' is used in the magnetic-tape data store. Quite a different system is the Panellit I.1609 information and computing set-up, such as will be used by an American chemical company to work out the basic equation for a distillation column, and in subsequent control of the column. This system is based on the 803 solid-state computer of Elliott-Automation Ltd., which provides simultaneous on-line and off-line computation.

It was Elliott-Automation who recently announced a sudden expansion in the market for computers, and the imminence of a 'break-through' in computers for process control (CHEMICAL AGE, 2 July, p. 23). It certainly seems inevitable that the technical, administrative and economic problems of applying computers to process control will be solved in the next few years, for processes are rapidly increasing in complexity and will soon reach a stage where no human operator, however quick and intelligent, will be able to respond fast enough to make the necessary control adjustments.

Unofficial Strike at I.C.I. Cheshire Factories

PRODUCTION at 10 I.C.I. factories, including the Alkali Division works Northwich, and other mid-Cheshire works, as well as the Winsford and Runcorn works is threatened by an unofficial strike of some 2,000 craftsmen, who are members of the A.E.U., E.T.U., Boiler-makers' Society and Building Trades Operatives' Union. As we go to press, warnings not to join the strike are being issued to production workers by their unions. Brunt of the strike is being borne by the Alkali Division, but an I.C.I. spokesman says "production is being maintained".

The craftsmen's decision to strike was in defiance of a decision by their unions on 18 July, at national level, to accept an offer by the company of 9s 7½d a week or more. I.C.I. craftsmen had asked for a minimum of £13 a week and are disappointed at the increase. Union acceptance of the 9s 7½d means that the lowest grade of craftsmen would earn £11 a week.

Spreading of the strike to production workers might lead to a serious reduction in output. On 26 July, a meeting between I.C.I. and the general workers' unions resulted in an offer of pay increases for nearly 50,000 general workers—2½d an hour for adult male workers and proportional increments for women and juniors. The union representatives felt unable to accept the offer at this stage and at their request the matter has been referred back to the company. Negotiations will be resumed on 3 August.

Also on 26 July, a meeting of about 300 craftsmen at Runcorn (General Chemical Division) decided to continue the strike. A further development is a ban on overtime by craftsmen at the Grangemouth, Scotland, works.

Geigy Buy Rayon Research Laboratories

THE Geigy Co. Ltd., Rhodes, Middleton, Manchester, have acquired, subject to contract, the offices and laboratories of the British Rayon Research Association at Heald Green, Manchester. The site and buildings have become available since the association is to merge with the British Cotton Industries Research Association (Shirley Institute), Didsbury.

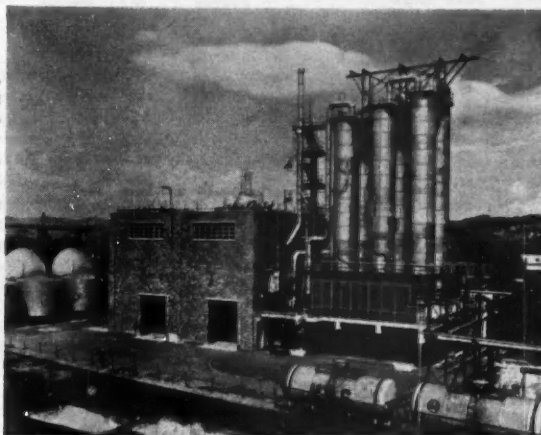
Geigy are members of the group which in Britain under Geigy (Holdings) Ltd. also includes the Geigy Pharmaceutical Co. Ltd., Wythenshawe, Ashburton Chemical Works Ltd., Trafford Park, and James Anderson and Co. (Colours) Ltd., Paisley.

The rapid expansion of Geigy Co. Ltd. has necessitated additional accommodation and the Heald Green site will not only provide this with a minimum of delay, but also give space for future expansion. It is intended to transfer the offices of Geigy (Holdings) and essential headquarters of the Geigy Co.'s sales, administration and laboratory activities from Rhodes some time next year.

Project News

New Process Nitric Acid Unit on Stream at Ardeer

View of the new I.C.I. Nobel Division plant at Ardeer for the production of nitric acid by the intermediate pressure ammonia oxidation process, described in 'Chemical Age' last week (p. 136). This view shows the six absorber towers, the process building and, on the far left, the ammonia storage spheres



● AIR PRODUCTS (GREAT BRITAIN) LTD. in association with the Butterley Companies have completed building an oxygen plant at Stewart and Lloyds steel works, Corby, Northants. The plant has an output of 200 tons of oxygen per day and is the first tonnage oxygen plant to be owned and operated by a steel company in the U.K.

Gaseous oxygen is produced at a pressure of 350 p.s.i. and at 99.5% purity. Gas storage under pressure is provided for 370,000 standard cu. ft. of oxygen. The plant incorporates the latest developments in 'low-pressure cycle' oxygen plant design, and provides low power consumption per ton of oxygen. This type of plant is to be recommended where liquid production and storage facilities are not of primary importance.

● A FERTILISER plant has been designed and is to be erected at Ennore, North Madras, by Simon Carves Ltd. The project is being partially financed by a loan of £600,000 from the Commonwealth Development Finance Company as a result of an agreement with East India Distilleries and Sugar Factories, Madras. The annual capacity of the plant, the first in India to produce compound ammonium phosphate, will be approximately 51,000 tons.

● THE North Western Gas Board has ordered a single unit automatic MS gas reforming plant for Crewe from Woodall-Duckham Construction Co. Ltd. The new unit will gasify light distillate (PFD) and have a guaranteed output of 2.2 million cu. ft. of 450 B.Th.U. gas a day. Construction will start soon and the plant is due to be operating in the early autumn of 1961.

● EQUIPMENT for the continuous pickling of steel strip (high-quality silicon steel strip for the electrical industry) has been installed at the Brierley Hill Works

of Richard Thomas and Baldwins Ltd. by the Kestner Evaporator and Engineering Co. Ltd., London. Two pickling lines have already been installed and a third will be added in the future. The acid used is a mixture of sulphuric and hydrofluoric, and the lines are designed to ensure a minimum consumption of water for washing the strip. The plant is manufactured in Keebush synthetic resin which has high resistance to acid corrosion. Strip is pickled at speeds up to 150 ft./min.

Cyanamid Recruit Staff for Melamine Plant

RECRUITMENT has already begun of extra staff for Cyanamid's Lederle Laboratories and the new melamine plant at Gosport, Hants. The extra staff is needed to man newly built extensions which will be coming on stream within months. The extensions, a large-scale antibiotics fermenting plant and a factory to produce melamine, will require about 120 extra staff to man them.

Managing director of Cyanamid of Great Britain Ltd., Mr. A. N. Williams, stated last November that a decision had been taken to build the melamine plant at Gosport to provide melamine crystals for the plastics industry.

Consolidated Beryllium Buy U.K.A.E.A. Beryllium Works

The Milford Haven beryllium works of the United Kingdom Atomic Energy Authority has been sold to Consolidated Beryllium Ltd. The works has hitherto been operated for the Authority by Murex Ltd., on an agency basis; Consolidated Beryllium will take over on 8 September and operations will continue on a reduced scale.

Consolidated Beryllium are managed by Imperial Smelting Corporation.



★ THE favourable market outlook in Europe for neoprene, which, as I stated last week, now accounts for about 2% of total rubber sales compared with 4-5% in the U.S., has led Du Pont to plan a 20% expansion to their new Ulster plant even before it is working to full capacity (see p. 161).

On Tuesday I was one of 90 guests flown from London to Northern Ireland to attend the opening of the Maydown Works by Lord Wakehurst, Governor of Northern Ireland. I learned that the plans to expand the 50 million lb./year capacity by 20% will not involve extensive engineering operations. It was also said that because of higher raw material costs it is not possible to make neoprene cheaper at Maydown than in the U.S., but a wider range of neoprene is made than at either of the U.S. plants—the newest at Montague, Mich., with a 50 million lb./year capacity and that at Louisville, Ky. (200 million lb./year). The higher cost of production is offset by a saving in import duty and freight charges.

Mr. Walter S. Carpenter Jr., chairman of E.I. Du Pont de Nemours hinted that the Common Market and Free Trade Association could lead to the manufacture of other products at Maydown. So far only 30% of the 365-acre site have been utilised and as was pointed out the company has no intention to go in for agriculture. A number of products have been considered but Du Pont have not yet made up their minds on the production of Delrin in Europe. Mr. Carpenter was accompanied by Mr. Lamott du Pont Copeland, vice-president, whom many think will succeed Mr. Crawford H. Greenewalt as president.

★ PYRETHRUM extract now has a significant place in international chemical trade, as is indicated by the recent move in the House of Commons to have pyrethrum import and export figures published separately in the U.K. Monthly Trade and Navigation Accounts (see 'In Parliament', p. 164). In fact, an intensive pyrethrum world's sales drive has gained increasing momentum since the Pyrethrum Board of Kenya in 1958 established new marketing arrangements through its own sales agents in each country. Flower production for the year ended 30 June was expected to total 6,300 tons, and that for the current year 9,500 tons—an increase of 115% in two years.

But the expansion is only just beginning, according to Mr. N. H. Hardy, executive officer to the Pyrethrum Board, who told the industry's first-ever European sales conference, in London, of plans to make pyrethrum Kenya's most

important export. He outlined the growth of the pyrethrum industry since its first year in Kenya, 1932, when the yield of flowers was a mere 31 tons. He admitted that the main problem today was processing capacity, since the old system of exporting dried baled flowers has been virtually replaced, to all countries but the U.S., by the export of liquid extract produced in Kenya. For this reason the Board, which opened its first extraction plant at Nakuru in March 1959, has now made arrangements for the erection of a second factory, which it is hoped will be in operation by May or June 1961.

★ GREATER versatility is being shown by the chemical elements in their relations with one another than might have been supposed, even a few years ago. Such is the opinion expressed by Dr. Dorothy Hodgkin, F.R.S., in a lecture, entitled 'Molecules in crystals,' given on the occasion of the Royal Society Tercentenary Celebrations.

In comparatively simple molecules, such as oleic acid, we can see the ways in which the molecules conform to the simple rules, the planar character of aromatic or multiple-bonded systems, the staggered conformation of hydrocarbon chains and the tendency to form hydrogen bonds in certain preferred directions.

The determination of the structures of such complex molecules as vitamin B₁₂, myoglobin and haemoglobin are some of the more spectacular advances made in the biochemical field, but in other fields of chemistry too, remarkable molecules are being found by X-ray analysis, some of which involve cobalt or iron in new and unexpected types of chemical bonding.

Looking back through history one is impressed by the many characteristics of molecular structure which were correctly inferred, often from very indirect evidence, and yet these structures as they have been found to be in detail also contain new and surprising features.

★ CRITICISMS of the method of electing Fellows of the Royal Society, which was described in our leader last week, were voiced by Pendennis in *The Observer* on Sunday. Two Fellows are reported to have said that the R.S. resembles nothing so much as certain marine organisms which have lost every faculty except that of reproduction. More specifically it is said to resemble the Pacific palolo worm which comes to the surface to breed once a year, on the day of the moon's third quarter in October or November (close to St. Andrew's Day), and then expires.

It is suggested that 99% of the Society's

energies are devoted each St. Andrew's Day to electing new officials and new Fellows. The process of sifting names is said to be "magnificent but all-consuming". Once the Fellows are elected, "the Society collapses exhausted for another year". Pendennis goes further and says that on an ordinary day the most striking feature of the Royal Society, which (like the emperor's clothes) no one quite likes to mention, is that there is nobody there. Apparently, the Fellows are down the road—at the Athenaeum.

The criticism made a week earlier in *The Observer* that the Society puts far too high a premium on old age, specialisation and caution is repeated. Fashionable sciences, like medicine are preferred to unfashionable ones like agriculture. It is alleged that young scientists are so exhausted and narrowed by specialising to get their fellowship that by the time they become Fellows they are incapable of any further achievement.

★ WHEN the Dyestuffs Act was repealed some time ago it was expected that changes would develop in the industry and that overseas competition for a share of the U.K. market would increase. There are now indications of a greater interest in the British market, particularly from the Continent.

One company now handling exclusively the products of the French dyestuffs combine, Compagnie Française de Matières Colorantes-Francolor-Paris, for distribution in Britain, is the Alliance Dye and Chemical Co. Ltd., Grecian Mill, Bolton.

I hear that a competent sales force is now being recruited and distribution will include not only dyestuffs, finishes and auxiliary products for textiles, but a wide range of products for such industries as paper, leather, rubber, paints and plastics.

★ DETAILS reach me of a new method of forming tiny flakes of synthetic mica into paper-thin sheets that may prove superior to natural mica for certain uses in electronics. Both the new paper and the synthetic-mica flakes from which it is made are the results of studies by the U.S. Bureau of Mines at Norris, Tenn.

The synthetic-mica sheets are strong and flexible and have high dielectric strength. These sheets will retain their properties even at high temperatures even better than natural mica.

The synthetic-mica flakes used in making the new paper are obtained by crystallising a melted mixture of feldspar, sand, magnesia, lithium fluoride and other minerals. The flakes absorb water readily, an advantage in forming them into sheets. Unfortunately, the same property causes the paper to soak up moisture when stored, thus lowering its dielectric strength. Further work to reduce this tendency is to be carried out in conjunction with General Telephone and Electronic Laboratories, Flushing.

Alembic

DU PONT NEOPRENE PLANT ON STREAM

U.S. Chairman Hints that Further Products May be Made in Ulster

ALTHOUGH the new neoprene plant of the Du Pont Co. (United Kingdom) Ltd., was designed to produce 50 million lb. a year and is not yet working to full capacity, plans are already in hand for a 20% increase. This was stated at the opening ceremony on Tuesday, when it was also hinted that Du Pont might produce other products at the Maydown Works, Londonderry, which occupies 30% of a 365 acre site.

Mr. Walter S. Carpenter, Jr., chairman of E. I. du Pont de Nemours and Co., Wilmington, who thanked Lord Wakehurst, Governor of Northern Ireland, for opening the plant, referred to the development of the Common Market and European Free Trade Association. He added: "This development could also contribute to the enlargement of the Maydown Works to embrace the manufacture of other products. We are hopeful that endeavours to find a solution to this situation will meet with success."

Mr. William H. McCoy, managing director of the U.K. company, declared that although the works had only just begun operations, expansion of capacity by about 20% was already being planned. This reflected the growing demand for neoprene in the European market and the success that the company had had in establishing the plant in Northern Ireland.

Production of neoprene not only meant a substantial cut in U.K. imports, but would also provide an additional source of income through exports. The plant design contained the latest technological improvements for the production of neoprene. As new developments on neoprene were made at Du Pont plants and laboratories both in the U.K. and the U.S., they would be incorporated in the Maydown Works.

To help in construction, Du Pont brought from the U.S. 18 top construction supervisory personnel; the rest of the construction force came from Northern Ireland. About 35 U.S. transferees helped to get operations started and several have already been replaced with U.K. personnel, as part of the parent company's policy to use local



William H. McCoy, managing director of Du Pont Co. (U.K.), left, and John C. Weyrich, works general manager at Maydown

residents to operate overseas subsidiaries.

The 150 guests who attended the opening ceremony from the U.K., Europe and the U.S., were welcomed by Mr. John C. Weyrich, works general manager. He said that 95% of the construction materials and equipment used in the plant, totalling about £4 million, was purchased in the U.K. The Maydown works provided over 400 jobs and the annual payroll now totals more than £300,000.

generator to supply acetylene, was described in *CHEMICAL AGE*, 25 June, p. 1059.

Chlorine is purchased from I.C.I.'s General Chemicals Division, Runcorn, and transported by the *Marwit* to Maydown. It is unloaded by nitrogen pressure into a 700-ton storage bank of 25,000 gall. tanks and piped directly to the process as needed.

The Coolkeeragh power station recently built adjacent to the Maydown site, supplies the Maydown Works with electricity, steam, cooling water and demineralised water. The Londonderry Rural District Council has constructed a new water treatment plant across the Faughan River to serve the three industries at Maydown with domestic water.

The Maydown Works is a multiple-type neoprene plant which will produce both dry neoprene and latices. The three major operating areas, MVA (monovinylacetylene), CD (chlorobutadiene) and polymerisation, are serviced by separate nitrogen, hydrogen, hydrochloric acid and refrigeration producing facilities.

Process. The first stage is the production of monovinylacetylene from acetylene gas, with the aid of a copper catalyst. This takes place in the MVA reactor, followed by purification in a number of distillation columns. The MVA is then sent to the CD area where it is reacted with hydrogen chloride to form chlorobutadiene, sometimes called chloroprene monomer.

The pure chlorobutadiene then goes to the polymerisation area, where the CD molecules are united under controlled conditions forming an elastomer which is then isolated as a film. The film is pulled into a 'rope' and cut up into chips which are tailed and packed into 50-lb. bags.

A catalyst similar to that used in the purification of acetylene, before the dimerisation stage, is also used in the chlorobutadiene process. Chlorobutadiene produced is of capacity of 99%. Polymerisation is effected batchwise in three 5,000 gall. kettles at a temperature of

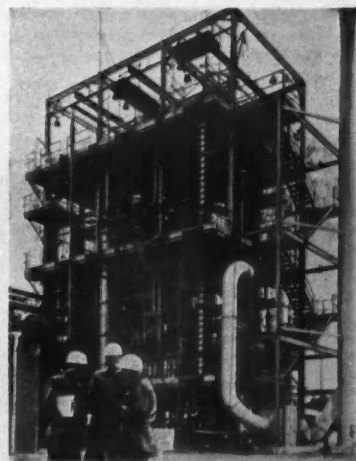
50 Million-lb-year Plant to be Expanded by 20%, says U.K. Managing Director

FIRST production of neoprene at the Maydown Works of Du Pont Co. (United Kingdom) Ltd. began in May, 29 months after the first earth was turned by the Du Pont construction organisation in January 1958. Progress during the start-up period has been on schedule and the company expects to be producing at full capacity within the next few months.

The Du Pont organisation handled design, engineering, construction and procurement, with only 18 construction men and 35 operations employees from the U.S. to help build and start-up the plant. Built on a 365-acre site, a former R.A.F. aerodrome, Du Pont purchased 95% of the construction materials and equipment in the U.K., totalling about £4 million.

Most of the raw materials for the Maydown Works, which is operated 24 hours a day, are produced in the U.K. A chartered boat, the *Marwit*, is equipped to bring in 200 tons of chlorine plus packaged raw materials on each trip from Runcorn, and to take back 500 tons of neoprene to Runcorn for distribution. Other raw materials are delivered by road transport, including propane from the Esso refinery at Cork. The plant has no rail service.

Acetylene is supplied by pipeline from Carbide Industries Ltd. located to the north of the Maydown Works. This plant, which produces calcium carbide in an enclosed rotary electric furnace and reacts the carbide with water in a dry



Monovinylacetylene area at Maydown



Night view of part of the Du Pont neoprene plant at Maydown

about 40°C, but this can vary between 10°C and 45°C according to the grade of neoprene being produced. Polymerisation can take between three to 10 hours, again depending on the type of neoprene.

Sub-zero temperatures required at certain stages of the process are supplied by the refrigeration area. The two refrigeration machines, said to be the largest in the U.K., pump brine through pipelines to the process equipment. These units are of 800 tons daily capacity.

Although the manufacture of neoprene is the chief interest of the plant, there are a number of other smaller manufacturing units in the plant which supply materials and services to the areas already mentioned.

There is a complete nitrogen manufacturing plant which produces all the nitrogen required for the process. Nitrogen is used to prevent air contamination.

Propane is reformed to produce hydrogen. The purified hydrogen is burned with chlorine to produce hydrochloric acid.

Because of the spawning of salmon and sea trout in the Foyle River system it has been necessary to ensure that the aqueous wastes discharged to the Foyle are non-toxic to fish life. Extensive facilities to remove copper and neoprene wastes from the process streams have been provided and the total process waste stream is neutralised before flowing into the Foyle. Two burners are provided for organic wastes.

In addition to the manufacturing plants, there are a number of service departments, including engineering shops,

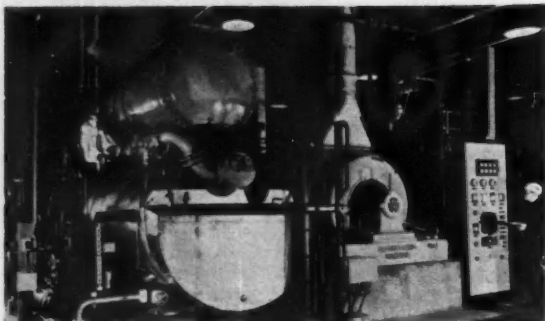
a stores building, a laboratory, where control samples are analysed, a canteen and an administration block containing a medical centre.

Neoprene. Neoprene is a multi-purpose synthetic rubber developed in the U.S. by Du Pont and which came into production in 1931. Since that time it has found its way into a multitude of end-uses. Neoprene is not just a substitute for natural rubber. Although it matches rubber closely in physical characteristics, its main attribute is superior resistance to attack from many of the influences that rapidly deteriorate ordinary rubber. These include weathering and sunlight, oil, heat and chemicals. In addition, neoprene does not support combustion.

Neoprene Used in Most Industries

Products from neoprene compounds go into virtually every industry. It is claimed that neoprene has been used to make more types of rubber products than any other synthetic. It has found wide application in the wire and cable industry, the petroleum industry, architecture and building, the motor car industry, shipping and many others. Dissolved in a solvent, it is used widely as an adhesive. Liquid compositions can be applied as durable protective coatings for equipment in chemical plants, plating shops and other locations with corrosive, fume-laden atmospheres.

A relatively new use for neoprene is as an addition to bitumen for road surfacing.



One of the two refrigeration units at Maydown, said to be the largest in the U.K.

Dutch Venue for Second International Plastics Exhibition

THE second International Plastics Exhibition will be held in Utrecht from 19-26 October 1960. More than 40 British firms will be represented, some by their European agents. Other firms will take part in a combined U.K. stand on which the British Plastics Federation are arranging an information bureau, which will be supported by the trade and technical Press. Another site has also been reserved for exhibitors of synthetic resins, moulding powders, chemical products and semi-finished articles.

The exhibition will follow the International Congress on the Technology of Plastics Processing, of which details were given in *CHEMICAL AGE*, 25 June, p. 1066. U.K. agents for the exhibition are Exhibition Consultants Ltd., 11 Manchester Square, London W.1.

Australia's First Big Chemistry Symposium

THREE Nobel prize winners will be among 500 delegates attending a symposium on 'The chemistry of natural products', in Melbourne during August. It will be the first international chemical conference to be held in Australia, and 150 of the delegates will come from 33 overseas countries. Sir Alexander Todd, Professor of Organic Chemistry, Cambridge, will be chairman.

The two other Nobel Laureates, Professor R. Kuhn, Heidelberg, West Germany, and Sir Robert Robinson, a director of the Shell Chemical Co. Ltd., and a former professor of Sydney University, will deliver papers. The symposium will open in Melbourne on 15 August. Organised by the Australian Academy of Science under the auspices of the I.U.P.A.C. Section of Organic Chemistry, it will last until 25 August, meeting also in Sydney and Canberra.

Soviet Science in English

The first issue of a catalogue of Soviet science in English is available from the Program for Scientific Translations, 14 Shammai Street, Jerusalem, Israel. The Program has been inaugurated for the purpose of providing English translations of recent and important Russian books in all branches of science, including chemistry, metallurgy and food and fuel technology. The Program is willing to send copies of the catalogue to any who care to apply.

Big Rise in Membership of Institute of Physics

Report of the Institute of Physics for 1959, adopted at the final meeting of the institute before its amalgamation with the Physical Society, shows that at the end of the year total membership in all grades was 6,754, an increase of 445 on the previous year. The number of applications for membership continued to increase and reached a new record of 933 during the year.

COMPUTER CONTROL OF DISTILLATION FOR STUDY AT WARREN SPRING

VISITORS to the Warren Spring Laboratory of the Department of Scientific and Industrial Research at Stevenage, Herts, during its 'open days', 21-22 July, were able to see what progress had been made since the official opening in June last year of this Laboratory, which replaced the former Fuel Research Laboratory and undertakes chemical engineering and other research on subjects of industrial significance. The laboratory block and the three pilot plant buildings now appear to be fairly fully occupied and equipped and the establishment has settled down well to its current programme. Praise for its organisation and efficiency was fairly general among the visitors, while the thorough methods of data recording and compilation also drew some comment.

Distillation Research

Chemical Engineering figures very largely in the Warren Spring programme and a special division is at present concentrating on the study of mass transfer processes in gas-liquid systems. This work comes under Dr. P. H. Calderbank, Ph.D., A.M.I.Chem.E., who, as mentioned in *CHEMICAL AGE* last week (p. 138) is shortly taking up a professorship at Edinburgh University. In one laboratory, a model distillation system was being used for the measuring of gas-liquid interfacial areas by observation of the optical reflectivity of foam produced on the plate. In another building, a Perspex model of a section of a distillation (sieve) plate was being used to measure the residence-time distribution functions of liquids passing across a distillation plate. This is done by injecting a suitable tracer, such as ink, into the turbulent liquid passing across the plate, the results being automatically recorded. Various other investigations have been carried out which show promise of yielding useful data for the design of distillation and gas absorption equipment.

Another project of great practical interest is aimed at achieving control of a distillation column by computer. A 12-plate pilot-scale distillation column has just been set up for this purpose, and the use of a De Havilland 'Anatrol' computer has been obtained.

Dropwise Condensation Promoters. Investigations have been continued into the mode of action of synthetic promoters used to achieve dropwise condensation on heat-exchanger tubes as an aid to heat transfer efficiency. Present indications are that attachment of the promoter to a copper tube starts with an activation process in which chemical bonding of sulphur to copper is followed by chain polymerisation. Attention has recently been turned to Montan wax as

a very efficient promoter which is different in its action from other promoters.

Fischer-Tropsch Process. Steady progress towards the solution of catalyst and reactor design problems continues to be made through the operation of the automatically controlled experimental plant, which uses a liquid-phase ('slurry') system for the synthesis of oil by the Fischer-Tropsch process, as well as with bench-scale and pilot-scale plants. The catalysts favoured at present

are precipitated iron oxides containing potassium as the main promoter. Studies are being carried out with the object of developing improved catalysts. An investigation into the variations in composition and manufacture of iron oxide catalysts is being carried out in collaboration with the catalyst suppliers, Peter Spence and Sons Ltd. Various other studies on the physical properties of catalysts, and their effect on chemical reactivity are being carried out at Warren Spring.

The laboratory is considering whether its work on catalysis should be expanded to increase its value to the chemical industry. Enquiries made through the Association of British Chemical Manufacturers suggest that industrial firms would appreciate such an expansion. No doubt the 'open days' will result in further industrial interest being exhibited.

A.B.C.M. Issue Booklet on Measuring Instruments for Process Control

A FUNDAMENTAL principle of instrumentation is that one must measure before one can control; this is emphasised by the deliberate exclusion of the subject of automatic control from a booklet just published by the Association of British Chemical Manufacturers entitled 'Chemical Plant Instrumentation—Some Notes on the Use of Measuring Instruments'. The booklet is based on a number of notes on this subject which have been issued, in typescript form, by the A.B.C.M. Instrumentation Advisory Committee over the past two years and provides, in more permanent form, a useful introduction to measuring instruments.

The first part of the book includes brief chapters on the measurement of temperatures (using thermocouples), absolute pressure and steam flow; then follows a discussion of analytical instruments for process use, describing the various chemical, physico-chemical and physical methods, and giving some guide to the

technical and cost aspects of instrument selection. The principles of, and apparatus for, gas chromatography are described in the next chapter, which is followed by one on continuous gas analysis by non-dispersive infra-red analysers. The short chapter on glass electrode pH meters includes a useful comment on general maintenance, while maintenance also figures very largely in the discussion of flue gas analysers for small boilers. The booklet concludes with some notes on smoke density meters, which have become of universal interest since the introduction of the Clean Air Act in 1958.

The text is accompanied by line diagrams where appropriate and a bibliography is appended to each chapter. This booklet should help the engineer, chemist or works manager to clear up any doubts or difficulties he has about measuring instruments. Copies are available from the A.B.C.M. at Cecil Chambers, 86 Strand, London W.C.2, price 6s to members and 7s 6d to non-members.

Dip. Tech. Course in Applied Chemistry at Liverpool

The Liverpool College of Technology's four-year sandwich course in Applied Chemistry is now recognised by the National Council for Technological Awards as leading to the Diploma of Technology and should be added to the Council's list No. 11 dated 31 March 1960.

Research Grants by the Chemical Society

Applications for grants from the research fund of the Chemical Society should be submitted not later than 15 November to the general secretary at Burlington House, Piccadilly, London W.1. Applications from fellows will be given priority. About £700 a year is available to provide grants for research in all branches of chemistry.

Chemical Society Anniversary Meetings

The scientific proceedings at the anniversary meetings of the Chemical Society, to be held in Liverpool from 11-14 April 1961, will be divided between two sections: (a) developments in the chemistry of boron compounds, and (b) some aspects of the chemistry of natural products, the two sections meeting simultaneously. Within each section there will be three sessions of lectures and papers; thus, section (b) will comprise discussions on the newer applications of physical methods, photochemical transformations, and porphyrins and related compounds.

The sessions will generally consist of a main lecture followed by invited contributions. In addition, various excursions and visits have been arranged. Final programme and application forms will be available in December.

Courtaulds Acquire Production Rights of Snia Viscosa's New Caprolactam Process

SINCE their first venture into sulphuric acid manufacture in 1916, Courtaulds have increased their capacity to more than a quarter of a million tons a year—mainly based on raw sulphur but pyrites is used in one plant while the company also participates in the United Sulphuric Acid Corporation which uses anhydrite. Carbon disulphide production also started in 1916 and at Trafford Park Courtaulds are believed to have the world's largest carbon disulphide plant with an annual capacity of some 70,000 tons. Acetate production calls for large quantities of acetic anhydride, acetic acid, acetone and other organic chemicals. Commercial and technical reasons have involved Courtaulds and British Celanese in the production of most of these chemicals. A further chemical manufacturing activity of Courtaulds is seen in the recent acquisition of the rights to produce in the U.K., by the new Snia Viscosa process, caprolactam for use in nylon production.

These facts concerning Courtaulds' chemical activities were given by the chairman, Sir John Hanbury-Williams, C.V.O., in his annual statement, when he gave shareholders a brief review of the company's development and showed how far they had extended into the production of their own raw materials. On the subject of European free trade, he expressed the hope that the U.K. and other governments involved would find solutions which would lead the U.K. into far closer trading relations with all the other countries of Europe, "the Six as well as the Seven". Meanwhile, Courtaulds had long been building up their investment in the Commonwealth and also increasing their interests in Europe. The directors' report referred to new developments in France in the manufacture of Courtelle acrylic fibre, and in Germany for the manufacture of carbon disulphide. In Italy Courtaulds have recently decided to strengthen their position still further by participating in the forthcoming increase in share capital by Snia Viscosa.

Beecham's New Tailor-made Penicillin May Wipe Out Staphylococcus

DRUG manufacturers have long sought a penicillin effective against the hitherto resistant staphylococcus. The Beecham Research Laboratories believe that they have succeeded in finding one. This development is a direct outcome of the penicillin breakthrough announced last year (CHEMICAL AGE, 14 March 1959, p. 453) when the Beecham team succeeded in isolating the penicillin 'core,' 6-amino-penicillanic acid. This was a big step forward which enabled research on penicillin to be conducted under controlled laboratory conditions instead of being the hit and miss technique of adding given substances to the fermentation brew which had been until then the only available means. Since then research has been directed towards producing a 'tailor made' penicillin to combat the problem of resistant-staphylo-

coccal infection which has attained serious proportions in hospitals.

Beecham's are not yet ready to announce full details of the new penicillin but clinical trials have been under way for some six months and they are confident that the new product will be the answer to this troublesome problem. The trials have been very successful and there have been some remarkable cases of patients, chronically ill for 12 months, being cured in a matter of weeks.

Contrary to popular belief, strains of staphylococcus have not developed a resistance to penicillin, although an acquired resistance has been produced in a test tube, but this is not pathogenic. Should the Beecham penicillin come up to expectations, and they are confident that it will, there is every hope of wiping out staphylococcus altogether.

B.o.T. Consider Removal of Import Duty on Di-Calcium Mineral Phosphate

THE Board of Trade is considering an application for removal of the import duty on calcium hydrogen orthophosphate of mineral origin (also known as di-calcium mineral phosphate), falling under tariff heading 28.40(H).

A statement of the applicant's case will be made available to all firms and organisations with a bona fide interest in this material who wish to make representations in the matter, if they are prepared to give an undertaking to treat the

information contained therein as strictly confidential and to allow their comments to be passed to the applicant for reply. Requests for a statement of the case, together with an undertaking in the terms set out above, should be addressed in writing to the Board of Trade, Tariff and Import Policy Division, Horse Guards Avenue, London S.W.1, not later than 12 August 1960. Comments on the application should reach the Board not later than 26 August.

£1.4 Million a Year for Natural Rubber Research

To make the natural rubber industry "one of the most progressive basic industries in the world", about £1.4 million is now to be spent each year on research and development. This was stated on Monday at a meeting of the Malayan Rubber Fund Board, by Sir Geoffrey Clay, controller of rubber research. He was speaking as chairman at the inaugural meeting of the new co-ordinating advisory committee which is to advise the board on the future direction of research.

He felt that the potentialities for future development might prove as great in the field of natural rubber as that of synthetic. Yield and cultivation of the rubber trees had already been greatly improved. One of the many promising lines of current research was concerned with the application of hormones to stimulate yield.

Technical service to manufacturers by personal representation is being expanded to help them choose the right rubber from the great range now available.

C.S. Library Facilities for Chemical Industry

WITH the approval of the Chemical Council, the Chemical Society is extending its library facilities to institutions, companies and other corporate bodies in the U.K. and Eire. Requests for the loan of books may be submitted by a departmental librarian or information office on behalf of any member of an organisation in the chemical industry. Charge for the loan service is packing 6d per parcel plus cost of postage. Basic charge per article for the photocopying service is 3s. with an additional charge of 2s per page for positive prints and 4d per page for negative microfilms.

Details are obtainable from the general secretary, Chemical Society, Burlington House, Piccadilly, London W.1.

In Parliament

Pyrethrum Import Export Figures to be Published?

Consideration will be given to the inclusion of figures relating to the import and export of pyrethrum extract as separate items in the U.K. Monthly Trade and Navigation Accounts. Mr. R. Maudling, President of the Board of Trade, said in answer to a question in the House of Commons. It was pointed out to him that the import of pyrethrum into the U.K. is about £500,000 annually and constitutes a relatively important part of inter-Commonwealth trade, also that there are a number of chemical products in the same division of which the imports are very much less which are itemised separately. Mr. Maudling thought there was a strong case for including pyrethrum figures, although it was too late for consideration for the 1961 Accounts.

HOPPER LEVEL SWITCHES

HOPPER level switches, designed to shut off the flow of granular or semi-solid material into a hopper, bunker or silo, when the level of the material reaches a height predetermined by the mounting position of the switch, have been developed by **Firth Cleveland Instruments Ltd.**, Treforest, Glam., a member of the Firth Cleveland Group.

Type HS 1017/1, for open hoppers, consists of an aluminium-alloy housing which is mounted on the wall or sloping floor of the hopper, the inside face being sealed by a strong synthetic-rubber diaphragm. When the material in the hopper presses against this diaphragm its deflection displaces a spring-loaded plunger, which actuates a standard single-pole changeover microswitch. The pressure of material against the diaphragm can therefore be arranged to open or close a circuit, for alarm or control purposes.

Another type, HS 1017/2, is for use in enclosed bunkers where the switch diaphragm may in some cases be exposed to a pressure differing from atmosphere. To enable the switch to distinguish between the pressure of the material and the abnormal air pressure in the hopper, the latter is fed also to the back of the diaphragm, and so becomes self-balancing.

REINFORCED PLASTICS PIPE SYSTEM

A COMPLETE pressure piping system of thermosetting epoxide resin reinforced with high strength glass fibres, in sizes ranging from 6 to 15½ in. bore, is produced by **Bristol Aeroplane Plastics Ltd.**, Filton House, Bristol. Piping is supplied in standard 20 ft. lengths with a range of ancillary fittings—tees, bends and flanges. The pipes can be either flange-jointed or bonded, the bonded-joint method being favoured for permanent pipeline installations. Special mobile equipment is available enabling pipes to be rapidly and efficiently bonded in situ. Bristol pipe is claimed to be virtually unaffected by soils, sea-water, demineralised water and the majority of dilute acids and alkalis, even up to temperatures of 120°C. The epoxide resin glass filament structure is also a non-conductor of electricity and is not subject to electrolytic action.

For the same operating pressures, Bristol pipe is approximately one-quarter the weight of steel components. The makers point out that its lightness makes for easy handling and this, in conjunction with the special bonding equipment, enables a high rate of laying to be achieved. Using the mobile pipe laying unit, three men can lay up to 200 ft./hr. of 6 in. diameter bonded pipeline.

TWO TYPES OF UNIFORMLY HEATED HOSES

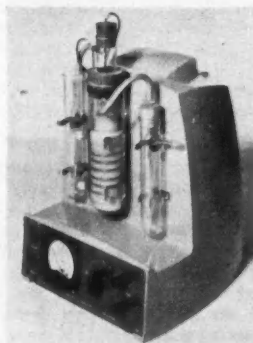
IN conveying heated liquids through hoses, the problem arises of maintaining the liquids at relatively high temperatures which are uniform throughout the length of the hose. Two new types of heated hoses, which make use of the conventional metallic strengthening materials in

hose walls and do not incorporate separate heating elements, are claimed to overcome this problem.

Heronflex has two concentric metallic braidings, imparting a high mechanical strength, and, as this braiding comprises a large number of wires heat is applied over the whole area by means of a low-voltage current. The braided structure of the conductor also permits a high degree of flexing. The braidings are electrically connected at one end while at the other they are connected to the secondary winding of a mains transformer. The greater concentration of heat is applied at the inner surface of the hose by making the inner braiding of high resistance steel and the outer braiding of copper so that a minimum of heat is lost.

Evaflow, the second type of hose, is relatively inexpensive. Instead of braided wire conductors it has two concentric wire coils in the hose walls. These again serve as both mechanical strengtheners and electrical heating elements but the hose will only withstand a comparatively low fluid pressure and a small amount of flexing. The inner coil has a greater resistance than the outer so that a greater concentration of heat is applied at the inner surface of the hose.

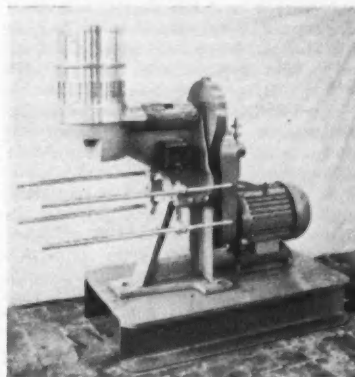
Both types of hose are produced in a range of lengths, bores and fittings, by **Heated Hoses Ltd.**, Sheffield.

COMPACT HYDROGEN GENERATOR

This apparatus has been especially designed for use in polarography, where a small but continuous flow of hydrogen is required for de-oxygenating solutions prior to polarographic analysis. It consists of a D.C. power pack and a special low voltage electrolytic cell built into a compact self-contained unit. A rotary switch enables hydrogen to be generated at four different rates up to 3,000 c.c./h. and in polarography 5-10 ml. of solution can be de-oxygenated in 4-5 min. Makers are **Southern Instruments Ltd.**, Frimley Road, Camberley, Surrey

EQUIPMENT NEWS

Chemical Plant : Laboratory Apparatus : Handling and Control Equipment



Model 52RB granulator by Apex

APEX ROTARY WET GRANULATORS

THE new range of Apex No. 52 rotary wet granulators is designed to handle sticky or waxy materials and are claimed to give a high production throughput. These granulators will handle plastic materials, including those of a waxy nature.

The No. 52R granulator produces granules by extruding material through a vertical perforated screen. The screens are fitted in the bottom portion of a stainless steel hopper which is in two halves, the lower half having square windows. The screens are easily interchangeable and are available with holes from 3/64 in. up to 1/4 in. diameter. The material is pressed through the perforated screen by means of a multi-armed spreader, being fed to the spreader by means of a feeder arm. A stainless steel shroud is fitted over the cast iron housing below the screen to discharge the granules, and tray supports are fitted to the granulator so that the granules can be collected on trays for drying. The spreader and the feeder are rotated on a vertical shaft in opposite directions. All parts in contact with the material are in stainless steel or Monel metal.

The No. 52 granulators are self-contained units complete with motor drive and are available in two sizes, one having an output based on sugar of 300 lb./hr., and the other an output of 1,800 lb./hr. Makers are **Apex Construction Ltd.**, 15 Soho Square, London W.1.

ADJUSTABLE PIPELINE FILTER

FOR installation in pipelines carrying fluids and gases, the new adjustable filter introduced by **I.V. Pressure Controllers Ltd.**, Spur Road, Feltham, Middx, is designed to cater for the present trend towards smaller particle sizes and is claimed to be unique in presenting an

infinitely variable filtration gap which can be adjusted to meet precise requirements while the filter is in its installed position. A graduated scale on the end of the filter housing indicates the various settings which may be selected in increments of 1 micron. The filter is stated to offer a means of achieving 100% cut off with any particle size since the filtration gap can be diminished at will either to meet changing conditions of flow, or to attain greater cut-off efficacy.

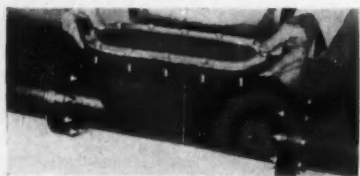
The filter element is in the form of a conical male plug arranged to fit within a similarly tapered female housing. Longitudinal grooves extend along part of the length of the element but only half of these are accessible to the fluid as it enters the filter and to escape it must pass, via the filtration gap, into the groove adjacent to the one it occupies. This configuration of grooves permits reverse flow. The element is secured to the housing by their mating screw threads. To adjust the filtration gap the element is held stationary by means of a spanner on the hexagon at its screwed end; the housing is then rotated by another spanner applied to the flats provided.

Standard models cover ranges of 6 and 11 microns and there are three models for each pipe size. The $\frac{1}{4}$ -in. model is a typical example: it accommodates $\frac{1}{4}$ -in. o.d. inlet and outlet pipes and the three variants of this model cater for ranges of 0 to 5, 5 to 15, 15 to 25 microns respectively. Seven pipe sizes are catered for at present—from $\frac{1}{4}$ to 1 in. o.d. in increments of $\frac{1}{4}$ in.

Working pressures are currently of the order of 4,500 p.s.i. and a further range suitable for pressures of 6,000 p.s.i. and upwards is under development.

POLYTHENE DRAINAGE FITTING

POLYTHENE plumbing systems are in use in laboratories, chemical works and atomic energy stations for the disposal of effluents, particularly highly corrosive and indeed radioactive material. One of the more recently developed moulded fittings in polythene for this type of



Polythene access chamber

work is the access chamber shown in the accompanying illustration, which is inserted in polythene drainage lines for inspection and cleaning. A polythene lid with chemically resistant rubber gasket is fitted with non-corrodible bolts and, if necessary to resist pressure, a stainless steel backing ring also.

This access chamber is produced by the **Chemical Pipe and Vessel Co. Ltd.**, Kenley, Surrey, who are engaged on a number of polythene drainage contracts. The company report that improvements are being made in the types of thermo-

plastic materials used in this specialised work and they are now making wide use of high-density polythene, which provides moulded pipe and fittings of great rigidity and strength, and able to carry effluents at higher temperatures than the standard polythene.

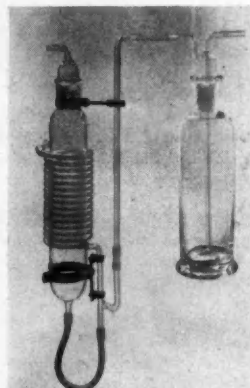
MECHANICAL SEAL



An exploded view of the Spectraflex split mechanical seal produced by **Flexibox Ltd.**, Trafford Park, Manchester 17. For sealing the glands of all types of rotary equipment, parts subject to wear are split for easy servicing and maintenance.

OXYGEN-FREE GAS SUPPLY SYSTEM

THE Nilox gas purification system enables the laboratory worker to obtain on the turn of a tap a continuous stream of hydrogen, nitrogen, argon, etc., completely freed of the oxygen normally contaminating these gases as supplied in



Nilox apparatus for obtaining an oxygen-free gas supply

cylinders. It is claimed that ordinary commercial nitrogen can be purified to a degree much superior to high purity commercial nitrogen and the system will reduce the oxygen content from 2,000 down to 0.2 p.p.m.

The apparatus consists of a purifier containing an organic reagent which absorbs the major part of the oxygen. This reagent is then regenerated in contact with a bed of lead wool. The gas then passes to a scrubber which finishes off the purification. This scrubber is designed for highly efficient gas-liquid exchanges. The primary absorbent is a chromium salt which is oxidised, but reduced back by contact with amalgamated zinc.

The gas stream may flow at any rate up to 20 litres/hr. and the reagents need only be renewed at long intervals. The

two purifiers, which are mounted on a special stand, will also retain impurities such as CO_2 , H_2S , SO_2 , Cl_2 , NH_3 and amines. The apparatus, made by **Southern Instruments Ltd.**, Frimley Road, Camberley, Surrey, can be used for organic synthesis, carrier gas methods, glove-box work, polarography and other operations requiring inert atmospheres.

DISPENSERS FOR LIQUID PEROXIDE

SUITABLE for liquid peroxides generally, and for Butanox in particular, a dispenser produced by **Novadel Ltd.**, St. Ann's Crescent, London S.W.18, is aimed at eliminating costly and dangerous spillage. The dispenser comprises a polythene bottle with a polythene tube, and glass measuring cylinder available in two sizes, either 10-50 ml or 5-15 ml. Accuracy of measurement is 0.4 ml and 0.2 ml respectively. The delivery tube in the glass cylinder has to be first adjusted to the required reading, then, by pressing the bottle, Butanox is pumped into the cylinder and, when the pressure is released, only the pre-measured amount will be retained. By inverting the bottle the correct amount of liquid is dispensed.

The syphon is in polythene and is suitable for dispensing liquid peroxides directly from 5-gall. bottles. By squeezing the bellow and releasing the pressure a few times, the tube is filled with liquid, which can be easily dispensed by turning the tap on and off.

FLOWMETER CALIBRATION STAND

ON chemical plants and refineries where large numbers of variable-area flowmeters are in constant use it is very useful to have facilities on the site for calibrating and checking these instruments. It is with this application in mind that **Fischer & Porter Ltd.**, Salterbeck Trading Estate, Workington, Cumberland, have introduced a complete calibration unit which may be used for flowmeter calibrations up to a maximum flowrate of 60 l.g.p.m. (water). The unit is contained in a stand which is 9 ft. high and requires floor space of about 8 ft. by 4 ft.

Water is passed through the instrument being calibrated at a manually controlled constant rate and the water is then collected in one of the calibrated measuring vessels. The whole operation is timed and the reading of the measuring vessel is taken from the appropriate calibrated sight glass.

There are three separate measuring vessels incorporated in the unit. The 'low' has a capacity of 1 gall, and is calibrated in 1/10 gall. intervals; the 'medium' has an 8 gall. capacity and is calibrated in 1 gall. intervals; and the 'high' has a capacity of 60 gall. and is calibrated in 4 gall. intervals.

The reservoir, pumps and measuring vessels are contained in the closed-in casing of the unit. The controls, sight glasses and instrument connections are arranged on the outside. A complete set of drawings, installation and operating instructions are supplied with each unit.

Overseas News

CONTRACTS FOR BOMBAY FERTILISER PROJECT TO BE AWARDED BY END-1960

THE Nangal fertiliser project of Hindustan Chemicals and Fertilizers Ltd., nearing completion, is to go into production towards the end of the year. It is expected that by that time electric power from the Bhakra hydroelectric scheme will become available in bulk for the project. Fertiliser factories at Rourkela and Neyveli are scheduled to start production in 1962 and 1963 respectively. Apart from these three public sector projects a fair amount of work has also been done towards the establishment of a Bombay fertiliser project. Contracts for major plants in this project will be awarded by the end of this year or early 1961, and the completed factory will start production by the end of 1963.

Hindustan Chemicals and Fertilizers have been entrusted with another project in Assam based on natural gas, which the Naharkatiya oilfields will yield when crude oil is extracted for the Barauni and Gauhati refineries. This will be a relatively small project, designed to produce 332,500 tons of nitrogen yearly, partly in the form of urea (50,000 tons/year) and partly as ammonium sulphate (50,000 tons/year). This would be sufficient to meet Assam's requirements.

The Government have already decided to merge the fertiliser operations at Sindri with the three projects under the charge of H.C.F. Ltd. It is possible that this merger will be followed by that of both Neyveli and Rourkela fertiliser projects.

Cuban Government Forms Import Monopoly

Last week-end the Cuban Government announced from Havana that it had taken over powers as sole importers for a number of important products including fertilisers. Imports are to be arranged exclusively by the Cuban Foreign Trade Bank. Imports of further products will be put in the hands of the State should this be "in the national interest".

Grace Overseas Division Plans New Chemical Plants

W. R. Grace and Co., New York, have changed the names of two of their eight chemical divisions. The Chemical Division becomes Nitrogen Products Division, while Dewey and Almy Overseas Division becomes Overseas Chemical Division.

Nitrogen Products Division operates an ammonia and urea plant in Memphis, Tenn., as its major chemical manufacturing activity. It has also been assigned the management responsibility for Federation Chemicals Ltd. in Trinidad, B.W.I., and Caribe Nitrogen Corporation in Puerto Rico. Both of these com-

panies are producers of ammonia, ammonium sulphate and sulphuric acid, while Federation Chemicals also produce urea.

The Overseas Chemical Division operates 12 plants in nine countries. It has recently been assigned the management responsibility for Eriez S.A. Produtos Magneticos e Metalurgicos, Sao Paulo, Brazil, manufacturers of permanent magnets as well as the recently acquired Industria Quimica Produtos Falticos S.A. also in Sao Paulo, manufacturers of basic organic chemicals including phthalic anhydride. It has plans for increasing its overseas manufacturing activities in several lines including many of the products of the other Grace chemical activities in the U.S.

France Reintroduces Duty on Styrene Monomer

The suspended French import duty on styrene monomer has been reintroduced. Provisionally the duty is at a minimal rate (that for most-favoured countries) of 14% *ad valorem*. Quantities shipped before the reintroduction of the duty will be excluded from payments if they have been imported for immediate use and not for storage.

Permission Granted for Solvay Soda Plant in Argentine

The provincial Government of the Mendoza region of the Argentine is prepared to permit the erection of a plant in the south of the province for the production of Solvay soda, local raw materials to be used as feed. Several foreign interests are already said to be willing to consider such a project.

Unilever-Emery Plan Fatty Acid Plant

The recently formed Unilever-Emery N.V. are to spend Fl. 7 million on the building of a plant at Gouda for the ozone cracking of fatty acids. The acids themselves will be supplied by the Gouda-Apollo works, next to whose site the new plant is to be built, ozone to be manufactured in the plant itself from oxygen piped from a production unit to be built for this purpose in Gouda by the Schiedam firm of N.V. W.A. Hoek's Machine-en Zuurstoffabrieken.

Two New Eastman Chemical Companies for Export Sales

The marketing organisation for Tennessee Eastman and Texas Eastman, manufacturing divisions of Eastman Kodak Co., is being expanded through a recently formed International Division.

The new division will be responsible for sales and service of fibres, chemicals and plastics manufactured by Tennessee Eastman and Texas Eastman in all countries except the U.S. and Canada.

Sales and service activities abroad will be carried out by two subsidiary corporations which are being formed. One will be named Eastman Chemical International AG. It will have headquarters in Zug, Switzerland, and a branch office in The Hague, and will handle sales in Europe, the Middle East, and North Africa.

The second company will be known as Eastman Chemical Ltd., and will be based at Nassau, Bahamas, with offices in Hong Kong. This company will be responsible for sales in Central America, South America, Australia, New Zealand, South Africa, and the Far East.

Metal Climax Plan Potassium Nitrate and Chlorine Plant

\$7 million are to be invested in the erection of a plant for the production of potassium nitrate and chlorine by American Metal Climax Inc., U.S. The plant, which will be situated in Vicksburg, Miss., will be operated by the Metal Climax department, Southwest Potash Corporation. The plant is expected to come into operation in October of next year.

Austrian Exports Down—Imports Up

Austrian exports of chemicals last year were down on those for 1958, the 1959 export value was Sch.992 million, compared with Sch.1,025 million. While the country's overseas sales of basic chemicals and of pharmaceuticals rose, exports of coal tar and petrochemical products and those of dyestuffs and tannin fell. Over the same period Austrian chemical imports increased by some Sch.500 million to a total of Sch.2,500 million. Imports of basic chemicals, plastics and synthetic resins went up over the year.

Lignosol Double Capacity at Quebec Plant

Plant additions which will double capacity have been opened in Quebec City by Lignosol Chemicals Ltd. The \$1 million expansion will enable Lignosol to manufacture Lignosol in the form of 50% liquids at a rate of 200 tons a day and in the form of powders at a rate of 80 tons a day. The spent liquor of sulphite pulp manufacture is used in making lignosulphonate chemicals.

Israeli Agreement for Joint Production of Bromines

A preliminary partnership agreement for the joint production and marketing of bromine-based products has been reached between the Dead Sea Works Ltd., and two leading international concerns, according to the Israeli Ministry of Development. The agreement will involve a \$700,000 investment and there will also be an exchange of technical data, while the foreign companies' exclusive marketing territories will be

opened to the products of the new partnership.

The Dead Sea Works Ltd. will own 50% of the shares. The plant's location has not yet been decided on but it will be either in Sodom or Beersheba, and managed by the Dead Sea Works.

Allied Chemical Co-operate in Large Mexican Halides Project

General Chemical Division of Allied Chemical, U.S. is providing technical data to Celulosa y Derivados, S.A., Mexico, for the production of hydrofluoric acid, carbon tetrachloride and fluorinated hydrocarbons. The Mexican company is to own and operate the plants, Allied Chemical having no financial interest in the actual project. The facilities are expected to meet Mexican needs and to provide a surplus for export to South America.

International Meeting on Hydrocarbons at Piacenza

An International Hydrocarbons Exhibition will take place at Piacenza from 12 to 18 September. An international conference on the transport, distribution and utilisation of hydrocarbons will also be held at Piacenza from 12 to 15 September.

Gamma Radiation of Moulded Polyolefins

MIMX Corporation of Glendale, Calif., U.S., are producing moulded polyolefin products that have been bombarded with gamma radiation. The special polyolefin formulations can be heated, moulded and bombarded. They can then, it is claimed, be heated and reshaped, but will revert to their original shape on reheating.

Sodium Tripolyphosphate Plant on Stream in Mexico

Hooker Chemical's Mexican subsidiary, Hooker Mexicana, came on stream last week with a tripolyphosphate plant with a capacity of 30,000 tons a year. Hooker's exports of sodium tripolyphosphate to Mexico were banned by the Government in September 1959 when Monsanto Chemical Co. brought a plant into operation near Mexico City.

Philippine Firm to Produce Manganese Dioxide

General Base Metals Inc., of the Philippines, plan to create an integrated mining and chemical business. A pilot plant is being established to produce manganese dioxide. Part of the production will meet local demand for this chemical, which is still being imported. The balance will be exported.

Reichhold-Hercules Australian Plant Due on Stream in 1961

The joint project of Reichhold Chemical Industries (Aust.) Ltd. and Hercules Powder Co., U.S., for which a plant is now being erected on a site at Springvale, Victoria, will produce resin-based emulsifiers for the manufacture of syn-

thetic rubber by the Australian Synthetic Rubber Co.

The plant, due for completion in 1961, will also produce chemicals for use in the manufacture of paper. Australian Synthetic Rubber are an offshoot of Vacuum Oil. Actual production will be under the name of the Hercules Powder Co. (Australia) Pty. Ltd., a jointly owned subsidiary of Hercules Powder and A. C. Hatrick Pty. Ltd., a wholly owned subsidiary of Reichhold.

Three New Electrolytic Manganese Plants in U.S.

A 10 million lb./year electrolytic manganese plant is to be built near Aberdeen, Miss., by American Potash, close to their existing sodium chlorate plant. Construction is due to start shortly and should be completed late next year. Two other U.S. companies recently announced their intention to build electrolytic manganese plants—Foote Mineral (20 million lb./year) at New Johnsonville, Tenn., and Union Carbide Metals (20% extension to 15 million lb./year) at Marietta, Ohio.

Dow to Offer Latex Technical Service in Europe

Dow Chemical International Ltd. S.A. are to set up latex technical service facilities and a quality control laboratory in Rotterdam. These will be operated in conjunction with the styrene-butadiene latex plant now under construction in the third petroleum harbour, Rotterdam. The new service will be available to Dow latex customers in Europe.

Approval for First Batch of Merck's Polio Vaccine

The U.S. Public Health Service has approved the first batch of 120,000 doses of Purivax, the new poliomyelitis vaccine of Merck Sharp and Dohme. Tests are said to show that two doses at an interval of a month give immunity to 90% of recipients, compared with a general

rate of about 60%. Price per dose is more than three times higher than that of the Salk vaccine.

Norwegian Nitrogen Plant to be Expanded

The Norwegian nitrogen plant of Glomfjord Salpeterfabrikker A/S, a member of the Norsk Hydro group, is to have its annual capacity expanded from 65,000 tonnes of products to 86,000 tonnes by 1964. Investments totalling some Crowns 30 million (£1.5 million) will be needed. The patent concern—Norsk Hydro—produced in the year ended 30 June 1960 products containing 268,000 (236,000) tonnes of nitrogen.

U.A.R. Nationalises Chemical Trade

The import and distribution of pharmaceuticals, chemicals and medicinal products has been nationalised by the Government of the United Arab Republic. The Government gives as its reasons for this step the "exaggerated profits" made by traders and the "regulation and reorganisation of trade". Former owners of businesses taken over are to receive compensation plus 6% of profits thereby lost.

Eastman Chemical Launch New Polythene Paper-coating

A new formulation of Tenite polythene especially designed to produce thin extrusion coatings on paper and other substrates is being marketed by Eastman Chemical Products Inc., subsidiary of Eastman Kodak Co., New York. The new material is claimed to have excellent adhesion to kraft and other papers, both porous and non-porous, as well as cellophane and other substrates. It is further stated that at weights as low as 7½ lb./ream (about 0.5 mil.) it easily produces coatings that are free of pinholes, and that its excellent and uniform drawdown properties permit coatings as thin as 3 lb./ream (about 0.2 mil.).

Hüls Concentrate Research Effort on Ziegler Field in Search of New Materials

RESEARCH by Chemische Werke Hüls A.G. during 1959 was concentrated in the field of 'Ziegler chemistry' and included work to produce new materials derived from cyclododecatriene and to develop their applications. Intensive work was also carried out in polyolefins and polydiolefins, as well as in the copolymers of those two groups.

Polypropylene is shortly to be produced in an existing pilot plant. Experiments extend beyond this to the use of other olefins for polymerisation purposes. Work on intermediates for synthetic fibres led to good results and, it is stated in the annual report, the company is prepared for developments that promise success.

The 1959 rise in turnover was achieved mainly with products made in extended

and new plants, or by improved processes. Higher wages and price cuts, made necessary by competition, were almost completely offset by the rationalisation programme and full utilisation of production capacity.

The bottleneck in ethylene supplies was overcome with expansion of capacity. Since an extension to the ethylene oxidation plant came on stream, the chlorhydrin process has been abandoned. An extended styrene monomer plant and plants for low-pressure polythene and phthalic anhydride came into operation.

Sales rose 5.9% to DM 612.5 million, excluding associated companies. Ignoring sales of Buna and butadiene, made exclusively by Bunawerke Hüls since 1959, the rise in sales was 11.3%; compared with 1957, turnover was up by 24.7%.

● **Mr. R. E. F. De Trafford** has been appointed a director of Lobitos Oilfields. He is chairman of Manchester Oil Refinery (Holdings).

● **Mr. H. G. W. Chichester-Miles** (Empire Rubber Co., and Rubber Bonders Ltd.) has been elected president for 1960-61 of the Federation of British Rubber and Allied Manufacturers. **Mr. S. D. Sutton** (Veedip Ltd.) and **Mr. C. H. M. Baker** (Firestone Tyre and Rubber Co. Ltd.) were elected vice-presidents.

● **Dr. I. Lauder**, Associate Professor of Chemistry, Queensland University, has won a research grant to Leeds University, where he will study ion-molecule reaction by mass spectrometry and supervise the installation of the university's first mass spectrometer.

● **Mr. J. N. Hogg**, a managing director of Glyn, Mills and Co., and a director of Borax Holdings Ltd., has been appointed deputy chairman of the advisory council of the Export Credits Guarantee Department.

● **Dr. W. V. Thorpe**, reader in chemical physiology at Birmingham University, has been appointed Professor of Physiological Chemistry with effect from 1 October.

● **Mr. Josef Pucik** is named as Minister for the Chemical Industry in the new Czech cabinet.

● **Dr. Hans O. R. Kramer**, a director of Farbenfabriken Bayer AG, Leverkusen, has been made an officer in the Belgian Order of the Crown. He received the award from the country's Minister of Trade, M. Jacques van der Schueren, for his part in the uniting of Europe.

● **Sir Alexander Fleck, F.R.S.**, is to give the seventh Fawley Foundation lecture at Southampton University on 10 November. The title of his address will be 'Science and industry; a blend with the humanities.'

● The title of Professor of Organic Chemistry, London University, has been conferred on **Dr. W. J. Hickinbottom** in respect of his post at Queen Mary College.

● On his retirement from the chair of Chemistry at Bedford College, **Professor E. E. Turner, F.R.S.**, has been appointed Professor Emeritus of Chemistry, London University.

● **Mr. Sterling Cole**, director-general of the International Atomic Energy Agency, recently met Sir Roger Makins, chairman of the U.K.A.E.A., to discuss the work of the Agency, followed by lunch at the House of Lords as the guest of Lord Hailsham, Minister for Science. He also visited the Radiochemical Centre, Amersham, the Atomic Energy Research Establishment, Harwell, the Wantage Laboratories, and the Calder Hall and Windscale plants. He was accompanied by **Dr. H. Seligman**, deputy director-

PEOPLE in the news

general of the International Agency.

● 'The new plastics materials and their potentialities' is the title of a paper to be given by **Dr. C. G. Addingley, Ph.D.**, director and chief chemist of British Belting and Asbestos Ltd., at the 1960 conference of the Purchasing Officers Association, to be held at Scarborough, 29 September to 1 October. **Dr. N. F. Astbury, M.A., Sc.D.**, director of research of the British Ceramic Research Association, will give a paper entitled 'Are ceramics in industry out-dated?'

Wills

Mr. Alfred Brewerton Craven, former chairman and managing director of Yorkshire Dyeware and Chemical Co. Ltd., left £66,602 net, duty paid £27,421.

Mr. Alexander MacDonald, a director of the Clydesdale Chemical Co. Ltd., who died on 14 May, left personal estate in England and Scotland valued at £102,263 8s 11d.

Outstanding Achievements in U.K. Chemistry Shown at Royal Society Exhibition

PRINCIPAL feature of a conversation held on 23 July as part of the Royal Society tercentenary celebrations was an exhibition of the outstanding achievements of British science in the last 10 years. The exhibition remained open this week.

The exhibits cover a wide range of topics from calculating machines to the physiological and biochemical aspects of plant growth. Although emphasis is on more recent developments in British science there is plenty of historical interest too, particularly a number of interesting documents including the manuscript from which the first edition of Newton's *Principia* was printed.

The most striking advances in chemical techniques of the last 20 years have been in methods of analysis and separation of complex mixtures of chemically similar substances. There is a well laid out exhibition of the techniques of chromatography and ion-exchange, organised by the Department for Scientific and Industrial Research in collaboration

Market Reports

Business Maintained Despite Holidays

LONDON Demand for industrial chemicals during the past week has been quietly steady. Most sections of the market are affected by seasonal influences, but, in general, home and export demand is sufficient to take care of available supplies. Prices are steady throughout.

There has again been little change in the position of the coal tar products.

MANCHESTER Due allowance again being made for holiday stoppages in the leading industrial outlets for chemicals and allied products, trading on the Manchester market during the past week has been fairly steady, with existing commitments in the alkalis and most other bread-and-butter lines being drawn against satisfactorily by home users as well as on overseas accounts. Prices generally continue on a stable basis. Among the tar products carbolic and cresylic acids, creosote oil and refined tar are finding a ready outlet, and a fair amount of early delivery business is being placed in fertilisers.

SCOTLAND As was expected market conditions generally have been much quieter during the past week due to the holiday period. However the level of business has been well maintained from those areas not yet affected and a fairly varied range of industrial chemicals have been demanded.

There has been little change in regard to prices. Conditions are still brisk in the export market with a good volume of enquiries being received.

with the National Chemical Laboratory and the National Institute for Medical Research. Particularly of interest are the different types of ion exchange material, granules, beads, films, fibres and papers that can be seen.

In another section, a working model of the continuous counter-current solvent extraction process for the separation of plutonium illustrates clearly this ingenious method which was developed at Harwell solely on the basis of semi-micro laboratory experiments. The exhibit shows the various stages of the laboratory and pilot plant work; the working model was constructed by I.C.I.

The exhibition is laid out with commendable clarity and perhaps the most striking impression which emerges from it as a whole is the growing interdependence of the sciences. This is particularly obvious in the vitamin section in which models of complex molecular structures, which have been completely determined by X-ray crystallography are shown.

Commercial News

Benn Brothers

Benn Brothers Ltd., publishers of CHEMICAL AGE, recommend a final dividend of 5% on ordinary shares for the year ending 30 June. This is in addition to the interim of 3% on preference and 5% on ordinary, both of which were paid at the time of the capital reorganisation, making a total distribution of £28,244 (£25,095). Consolidated net profit, after tax of £56,738 (£33,839), was £37,146 (£42,936).

William Blythe

Emphatic denials of rumours emanating from London, that Courtaulds were making a bid for the company's shares came from William Blythe and Co. Ltd., chemical manufacturers of Accrington, Lancs, who were "very indignant about these reports."

Similar rumours earlier this year were also declared by the company, at that time, to be without foundation (see CHEMICAL AGE, 2 April, p. 577).

Bowmans Chemicals

Interim dividend of Bowmans Chemicals is being raised from 4% to 5%. A three-for-ten scrip issue is proposed. Profits for the first eight months of the financial year ending 31 October are already substantially in excess of last year's total, and present indications are that the full year's results will show about twice the profits of the previous year. It would be the directors' intention to maintain the final dividend at the rate paid last year in respect of the capital as increased by the proposed issue, namely 6%.

Monsanto Belgium

A new company has been formed in Belgium with a capital of B.Fr.20 million under the name of Monsanto Belgium and with the aims of producing and marketing chemical and plastics products. Main holders of the concern's 4,000 shares—each of B.Fr.5,000—are the Belgian concern Société Industrielle de la Cellulose (Sidac) with 997 shares, Monsanto Chemical Co. (U.S.), Lion Oil Corporation and I.F. Lauckx Inc., each with 800 shares, and the Bullette Corporation, with 596 shares.

Yorkshire Dyeware

Plans are in being for the expansion of the existing plant of the Yorkshire Dyeware and Chemical Co. Ltd. and a new factory adjacent to the Hunslet works has also been acquired. This expansion is to be financed by a rights issue, with stockholders being offered 400,000 new 5s Ordinary shares at 10s 6d each in the proportion of one new share for every 5s stock unit held.

Boots Pure Drug

Referring to the prospects for the present financial year, Mr. J. P. Savage, chairman of Boots Pure Drug Co., said

- **Bowmans May Double Profits This Year**
- **I.C.I. Loan Stock Conversion Progresses**
- **Bigger Profit for Chemische Werke Huls**
- **Hoechst £1 Million Capital Increase**

at the annual general meeting that he was unable to add anything to his annual statement (CHEMICAL AGE, 2 July, p. 29) when he said the company were budgeting for a modest increase. "I cannot go any further than that except to say that at the end of the first quarter we are slightly ahead of our budget." Mr. Savage, who is retiring in March, said that the record profits for the past financial year were the result of splendid teamwork. The introduction of the profit-earning bonus seemed to have inspired all the staff into realising that they were now partners in the business.

I.C.I. Loan Stock

Further progress has been made with the conversion of I.C.I.'s 5½% convertible unsecured loan stock, since last week, when we reported that only 68% had so far been converted. Conversion rights expire on 31 July. As we go to press £4.96 million of the £5.6 million stock outstanding at the beginning of July has been converted. Holders who have not yet converted number 2,500, the still unconverted amount being £680,000.

American Enka

This company recorded a net profit of only \$680,000 for the first half of 1960, compared with a figure of \$3,480,000 for the same period of last year; this represents a profit per share of \$0.51 (\$2.64). Sales fell from \$49.9 million to \$45.5 million.

Chemstrand

Chemstrand Corporation announces a net profit of 13,430,000 dollars for the first half of this year, as compared with one of 14,830,000 dollars in the corresponding period of 1959. Sales fell from \$106.2 million to \$103.1 million over the period.

N.V. Chemische Fabriek Naarden

Netherlands chemical producers, N.V. Chemische Fabriek Naarden, Naarden, announce a dividend of 12% (10%) for last year, after recording a net profit of Fl. 2.7 million (Fl. 2.4 million) and a turnover which was 20% up on 1958. New foreign subsidiaries formed during 1959 were Naarden-Malaya Ltd., Kuala Lumpur, and Naarden Productos Organicos S.A., Barcelona.

Chemische Werke Huls

Chemische Werke Huls AG, Marl, announce a dividend of 15% (13%) for the 1959 financial year. The company—owned 50% by the Chemieverwaltungs-AG holding concern, Frankfurt-on-Main and 25% each by the two coal companies Bergwerksgesellschaft Hibernia AG and Kohleverwertungs-GmbH—recorded a net profit of DM22.5

million (DM16.6 million) for the year, when its turnover rose by 5.9% to DM612.5 million. Foreign sales continued to hold a 34% share in total sales at DM207.4 million (DM 197.7 million). Investments reached about DM85 million (same), and this year are to total about DM100 million. Some DM28.5 million (DM25 million) was spent on research, mainly in the fields of polyolefins and polydiolefins. (See also p. 168.)

Hibernia AG

The Government-owned German coal and chemicals company, Bergwerksgesellschaft Hibernia AG, Herne, announce that sales of chemicals rose last year to some £13,450,000 (£13,140,000). Although chemicals accounted for under one-quarter of total turnover, some 50% of the year's profits came from chemical production. The company produces nitrogenous chemicals and owns Scholven-Chemie AG and Phenolchemie AG. A dividend of 6% (same) is to be paid.

Hoechst

Farbwerke Hoechst AG, Frankfurt, are raising their capital by DM11.8 m. (about £1 m.) to DM630 m. (about £53.6 m.). The purpose of this step is twofold; to facilitate the introduction of Hoechst shares to foreign markets, including possibly London, and also to make shares available for placement among the company's employees. The company has also given their assurance that shareholders would be offered a rights issue when it is decided to raise the nominal capital again.

Scholven-Chemie AG

The Gelsenkirchen, West Germany, chemical concern Scholven-Chemie AG, has passed on to its 100% parent company, the State-owned mining concern Bergwerksgesellschaft Hibernia AG, an operating profit for 1959 of DM8,850,000 (DM5,470,000). Gross profits last year were DM83,600,000 (DM59,200,000). In the year under report Scholven started production of polythene and expanded production capacities for synthetic fertilisers.

Norsk Hydro

Norsk Hydro chemical producers of Norway, announce a turnover for the year ended 30 June, of Crowns 550 million (Crowns 5.5 million).

Zwanenberg-Organon

Zwanenberg-Organon, of the Netherlands, have issued Fl. 350,000 worth of new shares in connection with the extension to 100% of their holding in a French pharmaceutical concern.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.

MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.

MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP, £106 per ton; DAP, £100 10s., per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 6d d/d to 6s; golden, 3s 9d d/d per lb. to 5s 2d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 5-ton lots or more, bag packing, £41 per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots, £30 7s 6d.

Borax. Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid. In kegs, 1-4 cwt. lots, per cwt., £11; 5-19 cwt. lots, per cwt., £10 16s; 1 ton lots, per cwt., £10 15s; packed in paper bags, 1-4 cwt. lots, per cwt., £10 12s; 5-19 cwt. lots, per cwt., £10 8s; 1 ton lots, per cwt., £10 7s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 2s 1d.

Copper Sulphate. £83 per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

Iodine. Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodoform. Under 1 cwt., per lb., £1 2s 4d for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

Lactic Acid. C.P., d/d, 44% by wt., per lb., 13d; 50% by wt., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb., 9d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £104 5s per ton; orange lead £116 5s. per ton; Ground in oil: red, £125, orange, £137.

Lead, White. Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £116 15s; Ground in oil, £136.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £116 5s. per ton.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, £1 0s 3d; 5-cwt. lots, in 28-lb. parcels, £1 0s 9d; 1-cwt. lots, £1 1s.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700, ton lots, c.p., £103; BP (s.g. 1,750), ½-ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1 cwt, per lb., 7s 6d., per lb for 1-cwt lots, 7s 3d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11½d; 5-cwt. lots, per lb., 1s 10½d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £80 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1½d. Net del. D/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: disodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.

MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s. per ton. £11 7s 6d; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

Tartaric Acid. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £110; green seal, £108; red seal, £105.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84; 5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

n-Butyl Alcohol BSS. 10 tons, in drums, d/d, £137 10s.

sec-Butyl Alcohol. All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45

gal. drums, under 1 ton, £133; 1-5 tons £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

tert-Butyl Alcohol. 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £203; 45-gal. 1-4 drums, £209.

Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. 1-4 drums, £193 10s.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179; 45-gal. 1-4 drums, £185.

Diethyl Phthalate. In drums, 10 tons, d/d, per ton, £276; 45-gal. 1-4 drums, £282.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.

Absolute alcohol (74.5 o.p.). p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £40.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. In 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl isoButyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl isoButyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

isoPropyl Acetate. 10 tons, d/d, 45-gal. drums £132.

isoPropyl Alcohol. Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6½d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7½d per lb.; ex-store, Manchester, London and Glasgow, 7½d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 8d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8½d per lb. Ex-store Manchester, London and Glasgow, 9d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4½d; 40/50-gal. ret. drums extra, per lb., ½d.

MANCHESTER: Crystals, d/d, per lb., 1s 4½d-1s 7d; crude, naked, at works, 8s 5d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.

MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 12s. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 16s 6d about.

Toluol. Pure, per gal., 5s 9d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 1d.

MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 8½d-5s 10½d.

INTERMEDIATES AND DYES (Prices Normal)

m-Cresol 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

o-Cresol 30/31°C. D/d, per lb., 1s.

p-Cresol 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

p-Nitraniline. Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitroanthralene. Per lb., 2s 5½d.

o-Toluidine. 8-10 cwt. drums (drums extra), per lb., 1s 11d.

p-Toluidine. In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 2d.

Elcontrol Product Development Takes Shape

FOLLOWING a successful year in 1959, when output rose 30% over 1958, Elcontrol Ltd., Wilbury Way, Hitchin, Herts, have just completed an extension to their Hitchin factory. They have also made a number of appointments to the technical department in connection with a new programme of product development that is now said to be taking shape.

A special products division has been formed to bring under one control the design, production and application development sections for handling customers' individual needs. Many projects of this type involve the design and supply of complete control systems.

TRADE NOTES

Water Treatment Plant

A general agreement for the manufacture of Bobby water treatment plant in the Benelux countries and the rest of Europe excluding Scandinavia and Italy has been signed between N. V. Bronswerk, Amersfoort, Holland, and William Bobby and Co. Ltd., Rickmansworth, Herts.

The agreement contains provisions for the British and Dutch firms to collaborate in the design and manufacture of all types of electrodialysis plant.

Aerosol Polishes

There is a considerable and growing interest in polishes which can be applied from aerosols, both from the emulsion phase and also those based on solvents. Care must be taken in formulating these polishes, due to the risk of rust in the valve, or possible attack on the valve components. Technical service bulletin No 69 from Bush Beach and Segner Bayley Ltd., Marlow House, Lloyd's Avenue, London E.C.3, gives alternative formulations.

Instrument Acquisition

Lloyd Instruments Ltd., 28 Oak Hill Gardens, Woodford Green, Essex, have acquired the business of H. Millington, 10 Spencer Passage, London E.2, which will continue to operate under that name. Mr. H. Excell will remain as manager of the firm which will continue to offer instrument cases, cabinets and benches, made to specifications.

Chemicals for Cosmetics

Four technical information bulletins with particular reference to the cosmetics industry have been published by A. Boake, Roberts and Co. Ltd., Carpenters Road, Stratford, London E.15. Bulletin 204f deals with Abrac emulsifying agents for cosmetic and pharmaceutical preparations, 227b with Abrac aceto-glycerides, 144c with the use of iso-propyl fatty acid esters in cosmetics, and 157d with Abrac metallic stearates in cosmetics.

Plastics Pipe for Irrigation

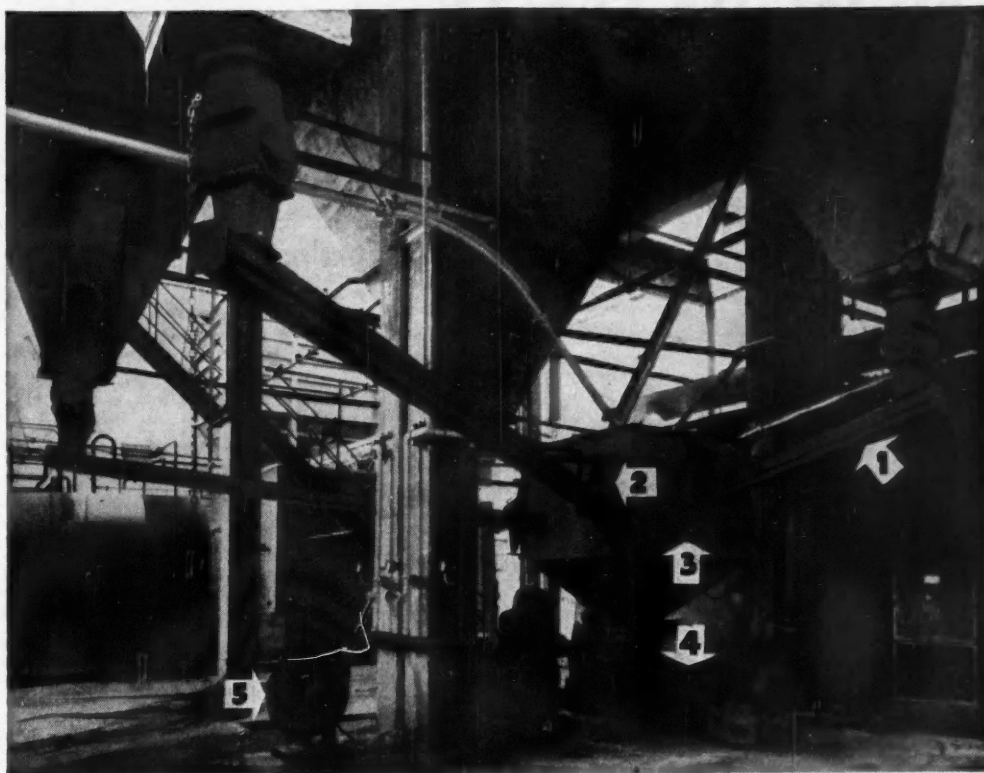
Easy-to-install pipe and fittings in rigid p.v.c., for distant-point irrigation systems, are being manufactured by Extrudex Ltd., Bracknell, Berks, the pipe being extruded from Geon RA170 high-impact p.v.c.

Change of Address

High Duty Alloys Ltd. have transferred their Birmingham sales office to 369 City Road, Edgbaston, Birmingham 16. All Forging Division sales matters will be dealt with at Redditch, as at present.

Shell Polystyrene Price

Prices of basic grades of Carinex polystyrene produced by Shell Chemical Co. will be reduced by 3d/lb. from 1 August, the new prices being 1s 11d/lb. for crystal and 2s 4d/lb. for colours. Premiums for small quantities of special colours and delivery surcharges have been dropped, but there will be a small additional charge for certain special colouring effects.



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NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 31 August

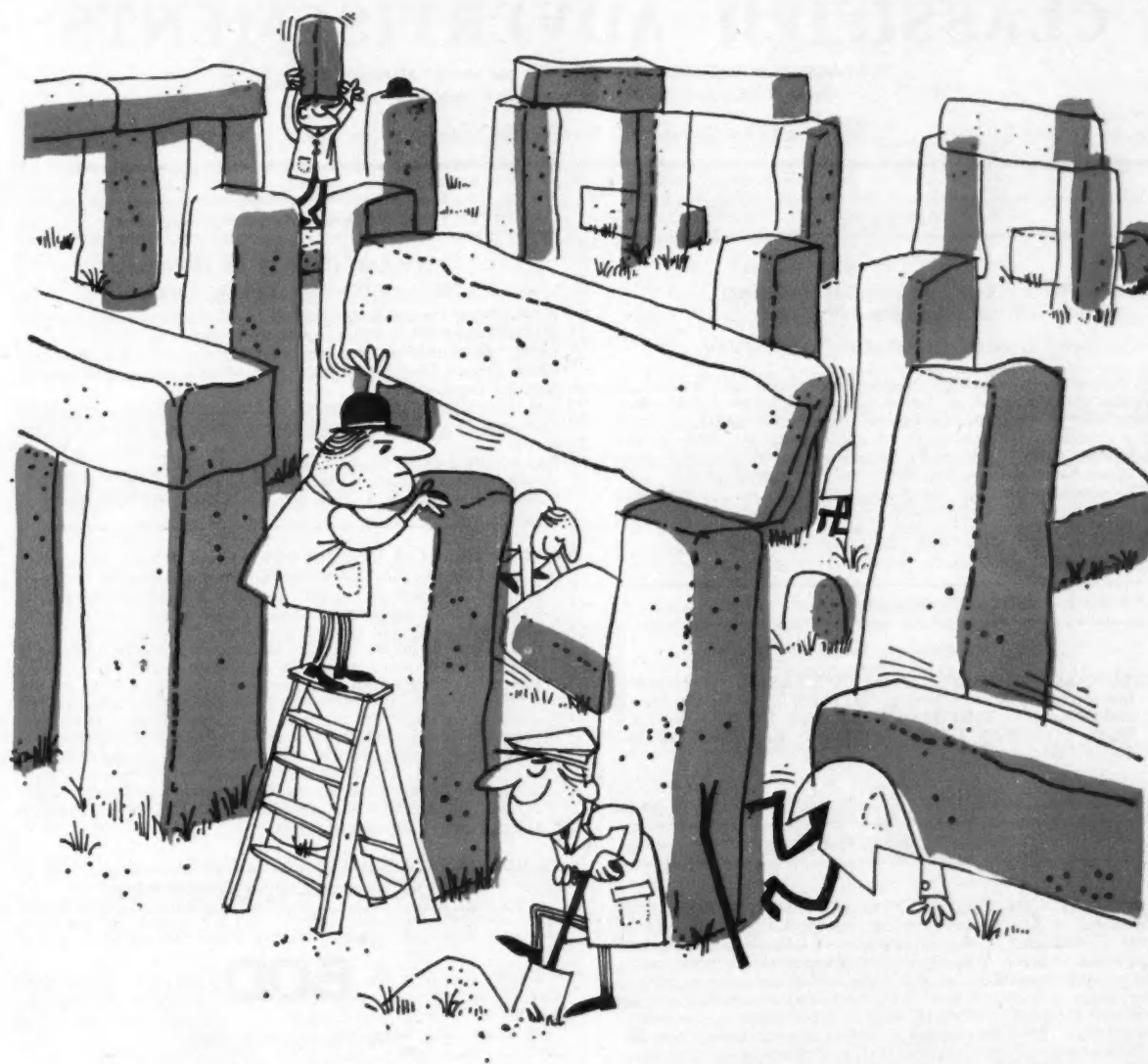
Light-sensitive polyesters and photographic reproduction processes employing them. Kodak Ltd. **846 908**
Steroid compounds. Merck & Co. Inc. **846 909**
Production of phthalic acids from xylenes. Aries Associates Inc. **846 442**
Preparation of vulcanisates and vulcanisable mixtures. Columbia-Southern Chemical Corporation. **846 443**
Indole derivatives. Smith & Nephew Ltd., T. J. **846 560**
Process for preparing esters of pyridine monocarboxylic acids from pyridine dicarboxylic acids. Aries Associates Inc. **846 475**
Polymerisation of olefins. Esso Research & Engineering Co. **846 731**
Process for reserpine derivatives and a process for the manufacture of reserpine and derivatives thereof. Ciba Ltd. **846 482**
p-Substituted benzene sulphonamides and processes for the manufacture thereof. Geigy AG, J. R. **846 573**
3-substituted 4-hydroxy-benzoic acids and their preparation. Merck & Co. Inc. **846 737**
Processes for production of low permeability carbon. General Electric Co. Ltd. **846 483**
Process for the manufacture of para-xylene. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister Lucius & Brining. **846 574**
Purification and vinylation of pyrrolidone-2. British Oxygen Co. Ltd. **846 575**
Polymerisable compositions. Imperial Chemical Industries Ltd. [Addition to 809 658.] **846 485**
Polymerisable compositions. Imperial Chemical Industries Ltd. [Addition to 810 940.] **846 486**
New direct-dyeing disazo-dyestuffs and process for their manufacture. Ciba Ltd. **846 487**
Dimethine dyes. Ilford Ltd. **846 298**
High solids vinyl dispersions and primers therefor. American-Marietta Co. [trading as American-Marietta Co. Stoner-Mudge Co. Division]. **846 492**
New colouring matters containing triazine rings and their use. Imperial Chemical Industries Ltd. **846 765**
Method and apparatus for recovery of entrained solids from gases. Phillips Petroleum Co. **846 585**
Heat recovery system for diphenylamine process. American Cyanamid Co. **846 588**
Quantitative determination of low concentrations of volatile compound in water or aqueous solutions. Central Electricity Generating Board, and Burdon, M. C. **846 498**
Non-corrosive synthetic detergent compositions. Hedley & Co. Ltd., T. **846 499**
Perfluorohaloolefin latex. Minnesota Mining & Manufacturing Co. **846 501**
Production of tetracycline. American Cyanamid Co. **846 510**
Process for the treatment of gaseous mixtures of carbon dioxide and ammonia. Montecatini Soc. Generale Per L'Industria Mineraria E Chimica. **846 511**
Liquid detergent compositions. Schneider, E. **846 504**
Process for producing oil additives. Esso Research & Engineering Co. **846 508**
Vinyl hydantoin. British Oxygen Research & Development Ltd. **846 601**
Process for the production of caustic alkali solutions from alkali metal amalgams and to apparatus therefor. Imperial Chemical Industries Ltd. **846 603**
Production of phenols. Distillers Co. Ltd. **846 516**

Preparation of tri- and tetrachlorethylene. Soc. D'Electro-Chimie, D'Electrometallurgie et des Acieres Electriques D'Ugine. **846 517**
Nitroquinolones. Imperial Chemical Industries Ltd. **846 611**
Manufacture of monovinylacetylene. Du Pont de Nemours & Co., E. I. **846 518**
Process for the preparation of aqueous gels from amides of polyuronic acids. Henkel & Cie. GmbH. **846 614**
Production of aromatic alkenyl compounds. Imperial Chemical Industries Ltd. **846 616**
Hard, rigid polymeric products of high impact resistance. Rohm & Haas Co. **846 519**
Fermentation process for the preparation of tryptophane. Pfizer & Co. Inc., C. **846 521**
New piperazine derivatives and process for the preparation thereof. Morren, H. **846 795**
Chemical process. Du Pont de Nemours & Co., E. I. **846 525**
Liquid-to-gas oxygen conversion systems. Bendix Aviation Corporation. **846 799**
Butadiene monoxide. Columbia-Southern Chemical Corporation. **846 534**
Process for the recovery of uranium. Comptoir Des Phosphates de L'Afrique Du Nord. **846 360**
Process of replacing active hydrogen by a hydrocarbon group. Abbott Laboratories. [Addition to 798 563.] **846 631**
Plutonium-cerium alloy. United States Atomic Energy Commission. **846 433**
Formation of chromate coatings on surfaces of aluminium and aluminium alloys. Pyrene Co. Ltd. **846 363**
Bonding of polyethylene to a rubber base. Phillips Petroleum Co. **846 218**
Processes for the removal of carbon black particles from suspension in the aqueous liquid. Bataafsche Petroleum Maatschappij N.V. De. **846 219**
Synthesis of glutamic acid and pyrrolidone carboxylic acid. International Minerals & Chemical Corporation. **846 220**
Process for the production of acetylene. Montecatini Soc. Generale per L'Industria Mineraria E Chimica. **846 368**
Process and apparatus for cooling coke oven gas. Allied Chemical Corporation. **846 643**
Linear polyesters. Union Carbide Corporation. **846 700**
Tri-N-propanolamine borate and composition containing same. American Cyanamid Co. **846 374**
Gel-inhibited polyester monomer mixture and method for preparing same. Rohm & Haas Co. **846 206**
2-substituted-2-propargyl propanediol dicarbamates. Frosst & Co., C. E. **846 377**
Synthetic resin compositions. General Mills Inc. **846 378**
Process for the production of water-soluble chlorine-containing derivatives of lignin. Udic S.A. **846 812**
Detergent compositions. Mo Och Domsjo A.B. **846 217**
Continuous production of hexachlorocyclopentadiene. Badische Anilin- & Soda-Fabrik AG. **846 814**
Polyepoxide compositions. Union Carbide Corporation. **846 380**
Foamed polyurethanes. Dow Chemical Co. **846 821**
Ore reduction. Texaco Development Corporation. **846 827**
Process for producing tertiary butylphenylamines. Farbenfabriken Bayer AG. [Addition to 756 538.] **846 226**
Esters of 2-oxo-17-β-hydroxy-A-nor-androstane and the preparation thereof. Organon Laboratories Ltd. **846 227**
New esters of O,O-dialkylphosphoric or O,O-dialkylthionophosphoric acids and the production of the same. Badische Anilin- & Soda-Fabrik AG. **846 229**
Manufacture of chlorine. Institut Francais du Pétrole, Des Carburants et Lubrifiants. **846 832**
Motor fuel containing substituted oxazoline compounds. Standard Oil Co. **846 231**
Production of monovinylacetylene. Du Pont de Nemours & Co., E. I. **846 234**
Continuous production of hydrochlorides of cycloaliphatic ketoximes. Badische Anilin- & Soda-Fabrik AG. **846 840**
Polymerisation of vinyl alkyl ethers. Goodyear Tire & Rubber Co. **846 690**

Compositions of water-soluble cellulose derivatives. Mo Och Domsjo A.B. **846 692**
Stabilisation of polymerisable compounds. Badische Anilin- & Soda-Fabrik AG. **846 239**
Production of γ-Benzopyrone derivatives. Recherches & Documentation Chimiques (Redchim). **846 247**
Method of producing conjugated diolefines. Institut Francais Du Pétrole, Des Carburants et Lubrifiants. **846 847**
Free-flowing ammonium chloride. Badische Anilin- & Soda-Fabrik AG. **846 667**
2, 4-dihydroxybenzophenone derivatives. Dow Chemical Co. **846 668**
Hydrolysis of protein substances. Cyklus Ltd. **846 682**
Polymeric materials comprising low pressure polyolefines. Petrochemicals Ltd. [Addition to 803 557.] **846 684**
Lubricants containing high molecular weight polymers of 1-olefins. Esso Research & Engineering Co. **846 685**
Separation of liquids. Allied Chemical Corporation. **846 540**
Production of cyanuric acid. Badische Anilin- & Soda-Fabrik AG. **846 670**
Detergent compositions. Unilever Ltd. **846 686**
Xanthene compounds and dyestuffs and means of producing the same. University of Kansas Research Foundation. **846 674**
Process for the production of a tryptamine derivative. Laboratoires Francais de Chimiotherapie. **846 675**
Process for the purification of vinylidene fluoride. Du Pont de Nemours & Co., E. I. **846 677**
Process for the catalytic oxidation of sulphur dioxide to sulphur trioxide. Chemiebau Dr. A. Zieren GmbH. [Addition to 819 128.] **846 678**
Ethylene production. Esso Research & Engineering Co. **846 679**
Stabilised polypropylene. Union Carbide Corporation. **846 695**
Polymeric compounds. Bataafsche Petroleum Maatschappij N.V. **846 856**

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Ion sources. Smith, L. G., and Woodward, W. M. **847 604**
Production of nitro phenol. Imperial Chemical Industries Ltd. **847 211**
Organic compounds containing nitrogen and fluorine. Haszeldine, R. N. **847 212**
Preparations for herbicidal, insecticidal or fertilising purposes. Josephs, D. P. H. **847 370**
Polypropylene fibres. Imperial Chemical Industries Ltd. [Divided out of 847 236.] **847 235**
Polypropylene fibres and films. Imperial Chemical Industries Ltd. **847 236**
Process for the polymerisation of olefins. Bergwerksgesellschaft Hibernia AG. **847 486**
Process for purification of polyolefines. Gelsenberg Benzin AG. **847 490**
Cyclosiloxane polymers. Union Carbide Corp., formerly Union Carbide and Carbon Corp. **847 082**
Preparation of light sensitive specially diazo-type material. Ozalid Co. Ltd., and Parry, E. **847 241**
Modified polyesters. Chemstrand Corp. **847 090**
Method for making cellular materials. Goodrich Co., B. F. **847 504**
Octahalo-gen-methylene-tetrahydrophthalans and a process for their production thereof. Ruhrchemie AG. **847 245**
Process for the production of unsaturated polyesters. Rheinpreussen Aktiengesellschaft für Bergbau und Chemie. **846 912**
Production of steroid compounds. Merck and Co. Inc. **846 914**
Methods of producing germanium crystalline bodies. International Business Machines Corp. **846 915**
Octahalo-gen-endo-methylene-tetrahydrophthalans and a process for their production. Ruhrchemie AG. **847 244**
Process for the preparation of pyrrole- α , α' -dicarboxylic acids or their salts or esters. Henkel & Cie GmbH. **847 246**
Preparation of crystalline polystyrene. Montecatini Soc. Generale per L'Industria Mineraria E Chimica. **847 102**
Germicidally active soap compositions containing silver salts of aromatic cyanamides and imides. Permchem Corp. **847 256**
Germicidally active soap compositions containing a reaction product of a silver salt and a heterocyclic compound. Permchem Corp. **847 257**
Germicidally active soap compositions containing a silver salt of an aromatic carboxylic acid. Permchem Corp. **847 258**



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PUBLIC APPOINTMENTS

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Chemical or Mechanical Engineer, or Metallurgist, required for post of Lecturer in the Department of Metallurgy. Successful applicant to teach basic engineering aspects of extraction metallurgy, including effects of heat, mass and momentum transfer on the design and operation of processes; also expected to conduct research designed to build up what is substantially a new field in Metallurgy. Previous research or industrial experience a considerable advantage. Salary, depending on qualifications and experience, in the scale £1,050 × 50 to £1,400 × 75 to £1,550 (bar) × 75 to £1,850 per annum, plus £60 per annum London Allowance. F.S.S.U. membership, and family allowance if applicable. Applications, with full curriculum vitae, to Professor F. D. Richardson, Department of Metallurgy, Imperial College of Science and Technology, Prince Consort Road, London, S.W.7.

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PUBLIC APPOINTMENTS: continued

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Applications invited from suitably qualified persons for post of Spectroscopist in the Public Analyst's Service.

Salary and conditions of service: Whitley Council for Biochemists (Basic grade), £645/£1,035 p.a.; commencing salary according to previous experience.

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